

V660

Dual-mode Phone

User's Guide

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Edition 1



About This User's Guide

Intended Audience

This manual is intended for people who want to configure the V660. You should have at least a basic knowledge of TCP/IP networking concepts and topology.

Related Documentation

- Quick Start Guide

The Quick Start Guide is designed to help you get up and running right away. It contains information on setting up your network and configuring for Internet access.

- Supporting Disk

Refer to the included CD for support documents.

- ZyXEL Web Site

Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

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Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User's Guide.



Warnings tell you about things that could harm you or your device.



Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Syntax Conventions

- The V660 may be referred to as the “V660”, the “device”, the “system” or the “product” in this User's Guide.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the “enter” or “return” key on your keyboard.
- “Enter” means for you to type one or more characters and then press the [ENTER] key. “Select” or “choose” means for you to use one of the predefined choices.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the “metric” value or the “scientific” value. For example, “k” for kilo may denote “1000” or “1024”, “M” for mega may denote “1000000” or “1048576” and so on.
- “e.g.” is a shorthand for “for instance”, and “i.e.” means “that is” or “in other words”.

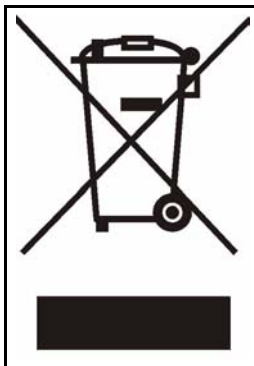
Safety Warnings



For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- ONLY qualified service personnel should service or disassemble this device.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY an appropriate power adaptor or cord for your device. Connect it to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe).
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the device and the power source.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Antenna Warning! This device meets ETSI and FCC certification requirements when using the included antenna(s). Only use the included antenna(s).

This product is recyclable. Dispose of it properly.



Battery Safety Precautions

Please read and follow these safety precautions when using and handling the V660's battery:

- **CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.** Dispose of them at the applicable collection point for the recycling of electrical and electronic equipment. For detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the store where you purchased the product.
- Before using the battery, carefully read any information supplied by its manufacturer.
- To charge rechargeable batteries, use only the charger units recommended by the manufacturer.
- Never try to recharge non-rechargeable batteries. This could cause them to leak or explode.
- Do NOT allow children to play with the battery.
- Do NOT use batteries with visible oxidation marks (leaking).
- If the oxidation products get into your eyes or onto your skin, immediately rinse with large amounts of water. In case of accidental swallowing, drink large amounts of water and induce vomiting, then call the doctor.
- NEVER expose the battery to high temperatures (such as fire or prolonged direct sunlight). This could cause the battery to ignite or explode.
- Do NOT open or mutilate the battery.
- The material contained in the battery may be toxic if swallowed.
- Exercise care when handling the batteries in order not to short the battery with conductive materials such as rings, bracelets, keys and so on. The battery and/or conductor may overheat and cause burns.

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PART I

Introducing the V660

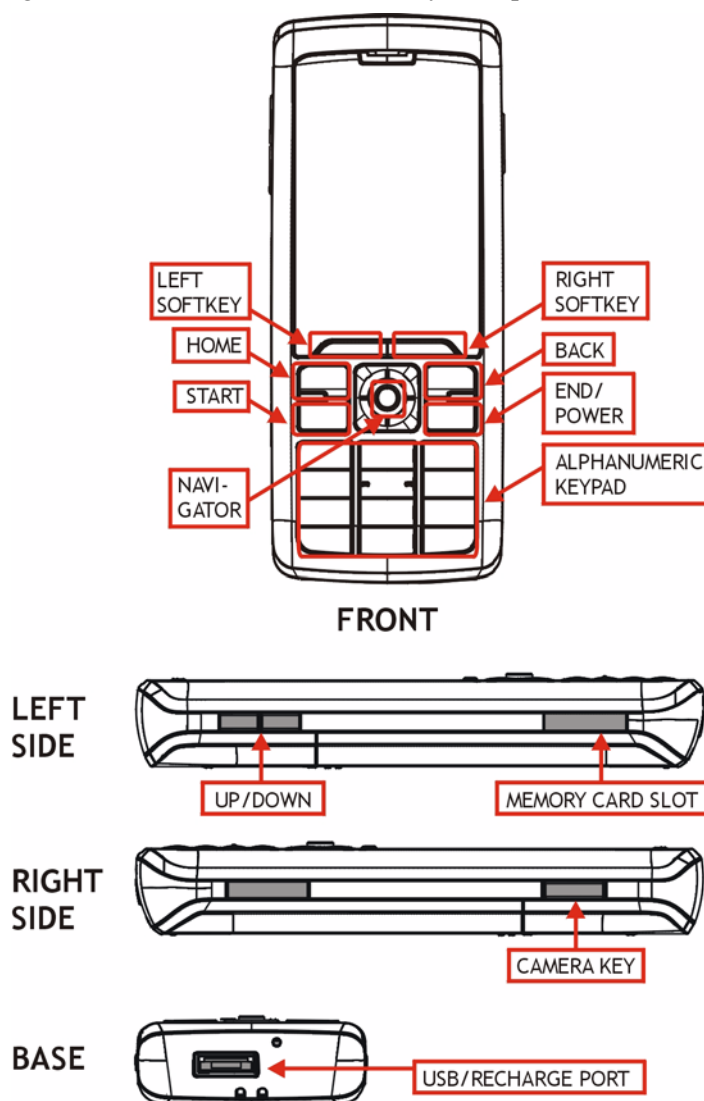
Overview (25)

Basic Functions (33)

Overview

1.1 Function Keys

The following figure shows the V660's function keys and ports.



The following table describes the keys and ports.

Table 1 Function Keys

KEY	DESCRIPTION
Up and Down keys	Press briefly to adjust volume, or mute a ringing tone. In the Home screen, press and hold the UP key to go to the Quick list . Press and hold the DOWN key to go to the Voice Notes function.
Left and Right softkeys	The function of these keys varies according to the current screen. A word above a softkey indicates its function.
Home key	Press to go back to the Home screen. Press and hold to lock the keypad.
Start key	Press to dial a number or receive a call. When one call is on hold, press to receive another. When two calls are active, press to switch between them. When one call is active, press to hold the call. When no calls are active, press to enter Call History.
T-flash card slot	Insert a T-flash (also known as Trans-Flash or microSD) memory card here.
Camera key	Press to activate the camera function. When the camera function is active, press and release to take a picture or start recording video.
Navigator	Move left, right, up and down to scroll through names, phone numbers, menus, and settings, or move the cursor to highlight in text editing. Click the navigator (press it in) to select the highlighted option in a menu or screen.
Back	Press to return to the previous screen, or to delete a character when entering text.
End/Power key	Press and hold to turn the V660 on or off. Press briefly to end or reject an incoming call, or to return to the Home screen.
Alphanumeric keypad	Enter numbers, letters and other characters.
USB Connector	Connect this to the charger to recharge the battery. Connect this (via the USB cable) to a computer to synchronize data. Connect this to a headset (external headphones and microphone) to use the headset.

1.2 Setting Up Your V660

This section discusses how to install a SIM card, a memory card, and how to install and recharge the battery.

1.2.1 Installing the SIM Card

The SIM (Subscriber Identity Module) card contains a computer chip that stores your personal number, phone book, and other services from your cellular service provider.

To insert a SIM card:

- 1 Remove the battery cover by pressing on it and moving it downward to open.
- 2 Remove the battery by lifting it up from the bottom end.

- 3 Insert the SIM card with the metal contact area on the card facing down. Ensure it is securely in place.

1.2.2 PIN and PUK

The PIN and PUK are codes you can use to protect the data on your SIM card and allow only authorized people to use its functions.

1.2.2.1 PIN

PIN means Personal Identification Number. This is provided with the SIM card. You can use this to prevent other people from using your SIM card without your permission. After enabling PIN protection, you need to input the PIN each time you turn your phone on. If you enter the wrong PIN three times in a row, the SIM card locks automatically. No-one can view data stored on the SIM card or use its functions. Use the PUK to unlock the SIM card if this happens.

1.2.2.2 PUK

When the SIM card is locked, only the PUK (PIN Unblocking Key) can unlock it. If you enter the wrong PUK ten times in a row, the SIM card locks permanently. Usually, the PUK is provided with the SIM card. If you lost your PUK or the PUK was not provided with the SIM card, contact your network operator.

1.2.3 Installing the Memory Card

Use a T-Flash (microSD) memory card to store images, video clips, music, and other data on your phone.

To insert a T-Flash Card:

- 1 Locate the **T-Flash** slot on the left side of the phone. Lift the protective cover.
- 2 Slide the card into the slot with the metal contact area facing up.
- 3 Replace the slot cover.

To remove a T-Flash card:

- 1 Remove the slot cover.
- 2 Press the release button (use a pencil or other slim object if necessary) to push the card out of the slot.
- 3 Replace the slot cover.

1.2.4 Battery Information

1.2.4.1 Installing the Battery

- 1 Remove the battery cover as in [Section 1.2.1 on page 26](#).
- 2 Align the exposed copper part of the battery pack with the copper contacts on the phone, then gently push the bottom of the battery into place.
- 3 Replace the cover.

1.2.4.2 Charging the Battery

The phone contains a rechargeable lithium (Li-ion) battery. The phone is designed to use only manufacturer-specified chargers and batteries.



When the battery is nearly empty, the V660 displays a warning notice and an empty battery icon. Charge the battery immediately. Otherwise, the V660 will shut down and any unsaved information lost.

- Carefully plug the charger's connector into the V660's USB port.
- Connect the charger's power plug to an appropriate power source. Turn the power on.
- If the V660 is switched off, the screen shows a charging battery icon, then goes blank. If the V660 is switched on, a battery charging icon appears in the status bar. The Operation LED comes on.
- Before you first use the V660, please charge the battery by using the accessory charger. The charging time takes 8 to 10 hours. A new battery reaches its best performance after two or three full charge/discharge cycles.
- When charging is complete, disconnect the charger from the phone.



When you first use the V660, charge the battery to its full capacity using the charger and NOT the USB data cable. This may take up to ten hours.

Due to the lower voltage supplied from a computer's USB port, the USB data cable cannot fully charge the V660. Use the charger instead whenever possible. Always using the USB data cable can affect the battery's longevity.

1.2.5 Power On or Off

Press the **End/Power** key for several seconds to turn the V660 on or off.



When you turn the V660 on for the first time, it prompts you to enter basic configuration information - date and time, time zone, phone password, e-mail account information, and so on.

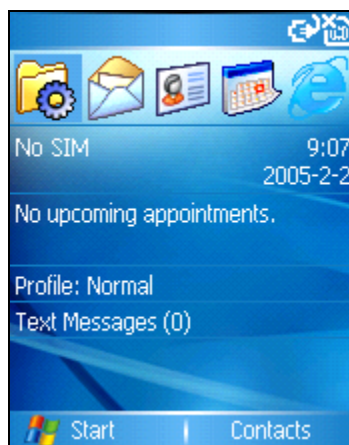


If there is no SIM card installed when you turn the V660 on, it displays a warning. Press the left softkey (**Done**) to continue to the **Home** screen.

1.3 The Home Screen

Turn your V660 on and wait for it to start up. The **Home** screen displays.

Figure 1 The Home Screen













1.3.1 Status Bar Icons

The Status bar displays icons relating to the V660's current operation, including battery power, cellphone signal strength, wireless connection and call status. The following table describes the icons that display.

Table 2 Status Bar Icons

ICON	DESCRIPTION
	You have a new e-mail or text message.
	You have a new MSN instant message.
	Incoming phonecall.
	Cellphone call in progress.
	The V660 is set to silent.
	Data call in progress.
	You forwarded a call.
	You have a call on hold.
	You missed an incoming call.
	Battery level indicator.
	Low battery alert. Connect the charger or USB data cable immediately!
	The battery is missing or faulty.
	The battery is recharging (the charger or the USB data cable is connected).
	Cellphone signal strength indicator.
	Zero signal.
	Cellphone radio off.

Table 2 Status Bar Icons

ICON	DESCRIPTION
	No SIM card installed.
	The SIM card is malfunctioning.
	The V660 has failed to sync with the PC.
	The V660's WLAN connection is switching to another Access Point (roaming).
	The WLAN is unavailable. The V660 is not connected to an Access Point.
	The WLAN is available. The V660 is connected to an Access Point.
	A VoIP (WLAN) call is in progress.
	GPRS is available.
	GPRS is connected
	A VoIP account is successfully registered

1.3.2 Shortcut Bar

Use the shortcut bar to quickly access the V660's various functions.

1.3.3 Display Area

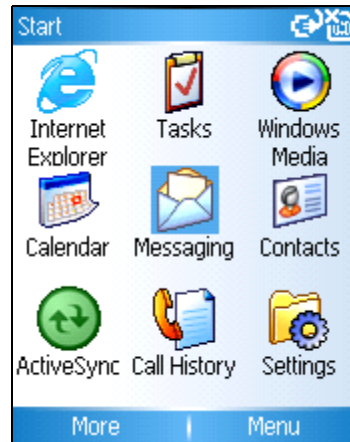
The display area shows the name of your cellphone operator, your WLAN network name (ESSID), list of appointments and reminders, the profile you are using and your text message status.

1.3.4 Soft Key Bar

This section shows the functions assigned to the left and right softkeys. These functions differ according to the current screen.

1.3.5 Start Menu

Press the left softkey (“**Start**”) in the **Home** screen to access the **Start** menu. This menu lists all the functions available on your V660.

Figure 2 The Start Menu

1.4 Add Speed Dial

You can set speed dial to automatically start one of the options from the **Start** menu when you enter a one- or two-digit number (see [Chapter 10 on page 87](#)). For example, if you assign Windows Media Player to the speed dial number **5**, press and hold the **5** key in the **Home** screen to jump directly to the Player. If you assign a two-digit number, press the first digit quickly and hold the second digit for longer.

Press **Menu** in the **Start** menu. Select **Add speed dial** (or press **1**).

Figure 3 The Start Menu - Add Speed Dial

1.5 Lock and Unlock

While the phone is on, press the **Home** key for a couple of seconds to lock the keypad. Press the left softkey, then the asterisk (*) key to unlock the V660.

Basic Functions

2.1 Making a Call

The following sections describe the various ways to make a call from the V660.

2.1.1 Making a Call from the Home Screen

When in the **Home** screen, press the numbers on the keypad to enter the phone number, then press the **Talk** key to make the call. Press the **Back** key if you need to delete a digit.

As you enter the phone number, your phone searches Contacts, Call History, Speed Dial lists, and your SIM card to find a matching number. Any matching names and numbers are displayed. When you see the name or number of the person you want to call displayed, select it and press the **Talk** key.

2.1.2 Making a Call from the Contacts List

2.1.2.1 Call by Contact Name

In the **Home** screen, press **Contacts** or select **Start > Contacts**. If there are many contacts listed, you can enter the first few letters of the desired contact's name to perform a search. Select the name of the person you want to call and press the **Talk** key. The phone number specified as the default phone number for that contact entry will be dialed (see [Section 2.1.2.2 on page 33](#)).

2.1.2.2 Change a Contact's Default Number

In the **Home** screen, press **Contacts** or select **Start > Contacts**. Select the contact whose default phone number you want to change, and then press the navigator right or left to change the default number. The abbreviation at the right side of the list indicates which of the contact's stored numbers is the default. For example, if you change **W** to **M**, the default number changes from **Work** phone to **Mobile** phone.

2.1.2.3 Make a Call from an Open Contact Card

In the **Home** screen, press **Contacts** or select **Start > Contacts**. Select the contact you want to call, and then press the **Action** button to display all the information for that contact. Use the navigator to select the number you want to call, then press the **Talk** key.

For more information about Contact list abbreviations and Contact cards, please see [Chapter 9 on page 81](#).

2.1.3 Calling a Recently-Dialed Number

In the **Home** screen, press the **Talk** key to display a list of recently-dialed names and phone numbers. Select the entry you want to call, then press the **Talk** key again.

2.1.4 Making a Call From the Call History List

Select **Call History** from the **Start** menu. Select the number or name you want to call, and then press the **Talk** key.

2.1.5 Making a Call From a Hyperlink

When you see a phone number presented as a hyperlink in an E-mail message or Web page, just scroll to it and click the navigator. In the screen that displays, verify that the number is correct, add any prefix number (country or area code, for example) and then press **Call** to call the phone number.

2.1.6 Making Emergency Calls

Calls to emergency service numbers can be made even if you have locked the SIM card and/or your phone.

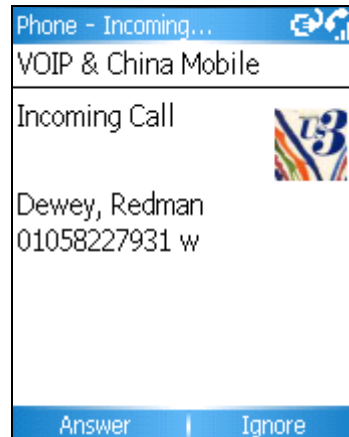
To place an emergency call, dial the emergency number appropriate for your location, and press the **Talk** key.



It is strongly recommended that you use the cellular phone network to make emergency calls whenever possible. Emergency calling may not be available over your WLAN connection, even if you have a VoIP account registered. Check with your VoIP service provider.

2.2 Receiving a Call

When a call is incoming, the name and number of the caller display on the screen. If the name of the caller is not in your **Contacts** list, only the caller's phone number is displayed.

Figure 4 Incoming Call

You can answer a call by pressing the **Talk** key or **Answer**.

If don't want to take the call, press **Ignore**.



Selecting **Ignore** connects the caller to your voicemail box, if you subscribe to this service.

When you are using a headset connected to the V660 and you enable **Headset** mode in **Settings > Profiles**, it will auto-receive an incoming call after a short while if you do not press **Ignore**.



If you enabled **Any Key Answer** in **Settings > Phone > Call Options**, you can answer an incoming call by pressing any key.

2.2.1 Answering a Second Call

If you are already talking on the phone and you receive another call, the **Call Waiting** screen displays. To place the current call on hold and answer the incoming call, press **Answer** or the **Talk** key to place the first call on hold and answer the second call.

Alternatively, if you want to end the first call before answering the incoming call, press the **End/Power** button, then press **Answer** or the **Talk** key to answer the incoming call.

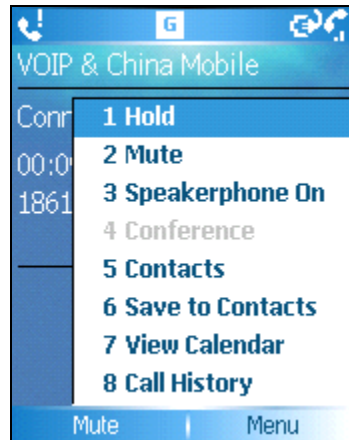
2.2.2 Ignoring a Second Call

If you receive an incoming call while already talking on the phone, and wish to ignore the second call, press **Ignore** in the **Call Waiting** screen. This will keep your current call in progress and connect the second caller to your voicemail box (if you subscribe to this service).

2.3 Functions During a Call

You can do various things while a call is in progress by pressing **Menu**.

Figure 5 In-call Menu



The availability of menu functions depends on your service provider. You may need to subscribe to certain services.

2.3.1 Holding a Call

During a call, press the right softkey and select **Hold**. Your V660 does not transmit or receive sound while the call is on hold. You cannot hear the other person, and the other person cannot hear you. The call is still active. Select **Resume** when you want to continue the call.

During a call, you can call another number. When the second call is connected, you can press the left softkey to switch between the two. Only the one that is currently active can hear you.

2.3.2 Muting a Call

If you want to stop transmitting sound during a call, press **Menu** and select **Mute** (resume the call by selecting **Unmute** from the **Menu**). When the call is muted, you can hear the voice from the other side, but they cannot hear you.

2.3.3 Using the Speakerphone

During a call, press **Menu** and select **Speakerphone**. To turn the speakerphone off, press **Menu** and select **Speakerphone Off**. The call remains active when you do this.

2.3.4 Conference Call

The V660 supports conference calling. Please refer to [Section 2.4 on page 37](#) for details.

2.3.5 Contacts

During a call, select **Contacts** from the **Menu** to view details of your contacts.

2.3.6 Viewing Calendar

During a call, select **Calendar** from the **Menu** to view details of your appointments.

2.3.7 Call History

During a call, select **Call history** from the **Menu** to view records of past incoming and outgoing calls.

2.4 Conference Calling

The V660 supports conference calling, with up to seven participants (including you). Each participant can hear when any other participant speaks.

2.4.1 Hosting a Conference Call

Do the following to host a conference call:

- 1 Answer a call, or make a call.
- 2 Once you are connected, put the first call on hold and answer or make another call.
- 3 Once you are connected, press **Menu** and select **Conference**. The current (second) call and the (first) call on hold are connected. All three parties can talk and listen to one another.

Figure 6 Conference Call



- 4 Add more parties to the conference call by repeating steps 2 and 3.

2.4.2 Splitting a Conference Call

If you need to converse with a certain conference call member privately, press **Menu** and select **Split**. All conference call members are listed on the screen. Select the one to which you want to talk privately. The conference call continues, but you and the member you selected cannot be heard by the other members (you cannot hear the other members, either).

Once you are finished, press **OK** to return yourself and the other member to the conference call.

2.4.3 Ending a Conference Call

During a conference call, press **End/Power** key to end the whole conference.

2.5 Call Transfer

The V660 support two types of call transfer.

- **Blind transfer:** in a blind transfer (also known as an unsupervised transfer) a single call is active, which you then transfer to another number.
- **Consultant transfer:** in a consultant transfer (also known as a supervised transfer), you have two calls active and transfer the first active call to the second. This allows you to ask the other person whether or not they want to receive the call.



Your service provider must support call transferring to use this feature.

Take the following steps to transfer an ongoing call to another phone number.

- 1 During the ongoing call, press **Menu**.
- 2 Select **Calling Transfer**.
- 3 If you are making a consultant transfer, the call is automatically transferred to the other active call.

If you are making a blind transfer, enter the phone number to which you want to transfer the call or select a number from the phonebook, in the same way as when you make a regular call. Press the **Start** key. The call is transferred.

2.6 VoIP Calls

Your device supports making and receiving voice calls over the Wireless Local Area Network (WLAN). These calls use VoIP, which is the sending of voice signals over the Internet Protocol. This allows you to make phone calls and send faxes over the Internet at a fraction of the cost of using the traditional circuit-switched telephone network. Internet Telephony Service Provider (ITSP) companies provide VoIP service.

Before you can make VoIP calls, you need to:

- Create a WLAN connection profile and connect to a wireless Access Point (AP).
- Create a SIP phone profile and register with a SIP server.

When you have done these things, you can make VoIP calls from all applications where you can make a regular voice call (see [Section 2.1 on page 33](#)).

2.6.1 Making a VoIP Call

To make a VoIP Call:

- In the **Home** screen, press #, and then enter the phone number.
- Press **Talk** to call.

See [Section 13.2 on page 103](#) for instructions on how to set up a Wi-Fi connection and how to configure a SIP Phone profile.

2.6.2 VoIP Call from Call History

If you want to make a VoIP from the Call History menu, select the number and press **Menu**. Select **WiFi Dial**.

Alternatively, if the number has a # prefix you can press the **Talk** key to call the number using your VoIP account.

PART II

Applications

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[Pocket MSN \(59\)](#)

[Tasks \(63\)](#)

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[Speed Dial \(87\)](#)

[ActiveSync \(89\)](#)

[Call History \(93\)](#)

[Settings \(97\)](#)

Internet Explorer

Using Internet Explorer (IE), you can connect your V660 to the Internet, and use network-based applications. Your V660 supports Internet connection in three ways:

- Regular data call via GSM (Global System for Mobile communications).
- GPRS (General Packet Radio System), based on GSM and providing higher data rates using packet-switching.
- Wireless LAN (WLAN) connection.

To connect your V660 to the Internet using IE, you need to:

- Make sure that your SIM supports Internet connection (for data call or GPRS connection). If unsure, consult your cellphone service provider for information.
- Order data operating services or GPRS services from the service provider (for data call or GPRS connection).
- Connect to an Access Point on your WLAN with Internet access (for WLAN connection).
- Correctly set up IE on your phone.

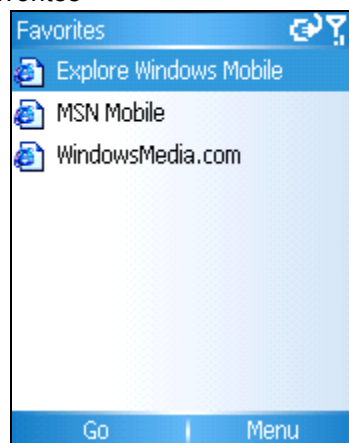
Consult your service provider for detailed information.

3.1 Using Internet Explorer

When you open IE for the first time, the **Favorites** screen displays.

To go to a web site from this screen, select it using the navigator and click **Go**.

Figure 7 Internet Explorer: Favorites



To enter a web site address manually, press **Menu** and select **Address bar**. Enter the address and press **Go**.

When using IE, press the **Back** key to return to the previous page.

Press the **End/Power** key to disconnect from the Internet and exit the browser.

3.1.1 Favorites Menu

In the **Favorites** screen, you can select following items in the **Menu**:

Figure 8 Internet Explorer: Favorites Menu



The following table describes the labels in this screen.

Table 3 Internet Explorer - Favorites Menu

LABEL	DESCRIPTION
Address bar	Enter the address of a Web site you'd like to browse.
Add Favorite	Add an entry to the Favorites list. You can enter a Web site's address, the name of the site, and specify the folder to save it to.
Add Folder	Create folders to make your Favorites convenient to navigate and manage.
Edit	Edit the address of an item in the Favorites list.
Delete	Remove an item from the Favorites list.
Options	Set up the browser. See Section 3.2 on page 46 .

3.1.2 Online Menu

When you are browsing a Web site, you can select the following items from the **Menu**:

Figure 9 Online Menu

The following table describes the labels in this screen.

Table 4 Internet Explorer - Favorites Menu

LABEL	DESCRIPTION
Address bar	Enter the address of a Web site you'd like to browse.
Favorites	Save all your favorite pages here, for easy access.
Add to favorites	Add the current page to the Favorites list. You can edit the Web site's address and the name of the site, and specify the folder to save it to.
Forward	Go forward to the next page in the Web page History.
Refresh	Reload the current page.
History	Recently-visited pages are stored here from which can you select one to visit.
View	Select the way the V660 displays Web sites.
Zoom	Select a resolution for displaying web pages.
Tools	Send links, view properties and configure your browser.

3.1.2.1 Tools

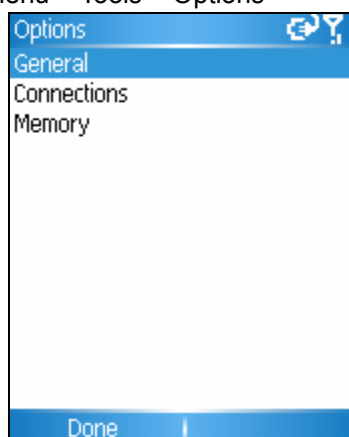
When you select **Tools** from Internet Explorer's online menu, you can send the address of the web page you are browsing to others by mail, view the properties of the current page, or set up the browser. To set up the browser, please refer to [Section 3.2 on page 46](#).

Figure 10 Internet Explorer: Online Menu: Tools

3.2 Setting up Internet Explorer

In Internet Explorer, select **Menu > Tools > Options** to set up IE.

Figure 11 Internet Explorer: Menu > Tools > Options



3.2.1 General

Select **General**. The following screen displays.

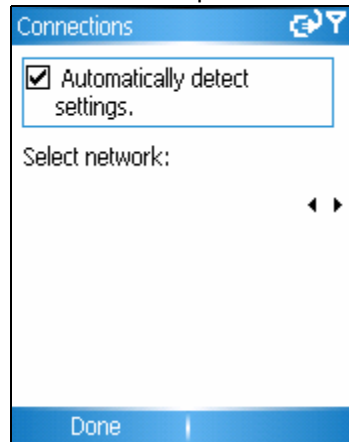
Figure 12 Internet Explorer: Menu > Tools > Options > General



3.2.2 Connections

Select **Connections** to change the way the V660 connects to the Internet.

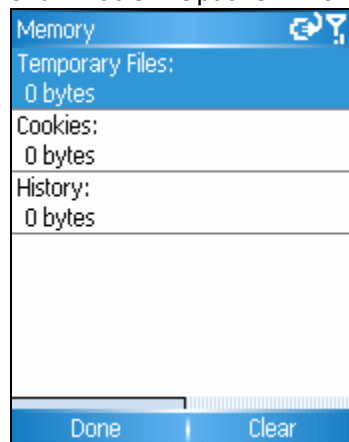
Automatically detect settings - the V660 auto-selects the correct way to connect to the Internet.

Figure 13 Internet Explorer: Menu > Tools > Options > Connections

3.2.3 Memory

Select **Memory** to view IE's memory status. Also, use this screen to clear IE's history of pages viewed, delete all cookies and clear the V660's temporary Internet files.

Press **Clear** to clean out temporary files, Cookies, and History records.

Figure 14 Internet Explorer: Menu > Tools > Options > Memory

Windows Media

The built-in Windows Media Player® can play audio and video files stored on your V660 or an installed memory card, or on the Internet.

4.1 Playing a File

To start Windows Media Player, press **Start > Windows Media**. By default, the **Library** window displays, from which you can browse to the file you want to open (see [Section 4.3 on page 51](#)).

To go to the main Windows Media interface from the **Library**, press **Menu > Player**.

Figure 15 Windows Media Player Screen



4.1.1 Media Player Button Operations

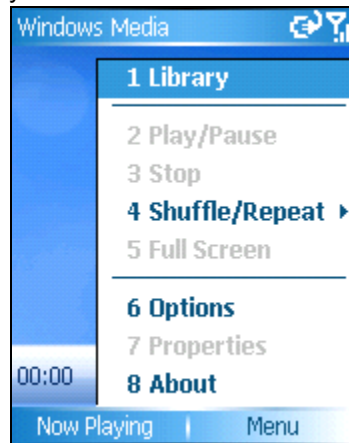
Use the navigator to move from one media file to another, or adjust the volume.

- **Pause**
Click the navigator to have the current playing file pause.
- **Return to start of file**
Press the navigator left while playing a file.
- **Jump to next file**
Press the navigator Right while playing a file.
- **Adjusting volume**
Press the navigator up or down, or use the side keys.

4.1.2 Player Menu

In the **Player** screen, press **Menu**. The following screen displays.

Figure 16 Windows Media Player Menu



The following table describes the labels in this screen.

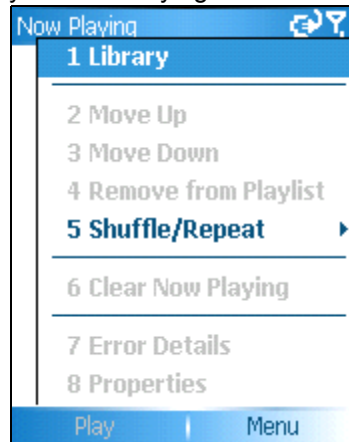
Table 5 Windows Media Player Menu

LABEL	DESCRIPTION
Library	Select this to go to the Library screen. All media files are stored here.
Play/Pause	Select this to play the currently selected file or, if it is already playing, pause it.
Stop	Stop playing the current file.
Shuffle/Repeat	Select Shuffle to have the V660 play the current playlist in random order. Select Repeat to have the V660 play the current file again from the beginning each time it finishes.
Full screen	Expand the video file window to fill the V660's whole screen.
Options	View and modify Windows Media Player settings.
Properties	See details of the current file.
About	See the Windows Media Player's version number and copyright information.

4.2 Now Playing

Press **Now Playing** in the main **Player** screen. The **Now Playing** list displays the files in the current playlist.

Press **Menu**. The following screen displays.

Figure 17 Windows Media Player: Now Playing

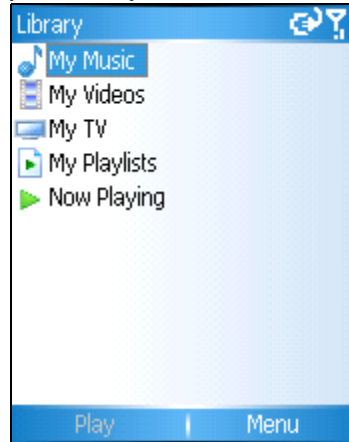
The following table describes the labels in this screen.

Table 6 Windows Media Player: Now Playing

LABEL	DESCRIPTION
Library	Go to the library screen, where you can choose a file or playlist to play.
Move Up	Move the highlighted file up one position in the play list order.
Move Down	Move the highlighted file down one position in the play list order.
Remove from Playlist	Delete the highlighted file from the play list. The file is still saved in the media library.
Shuffle/Repeat	Select Shuffle to have the V660 play the current playlist in random order. Select Repeat to have the V660 play the current file again from the beginning each time it finishes.
Clear Now Playing	Deletes all files from the Now Playing play list. The files are still saved in the media library.
Error Details	Display error information about the highlighted file.
Properties	Display detailed information about the highlighted file.

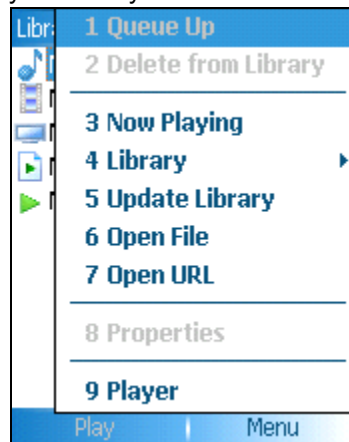
4.3 Library Screen

All the V660's media files are saved in the library. You can browse the **Library** screens and select files to add to the playlist.

Figure 18 Windows Media Player: Library Screen

4.3.1 Library Menu

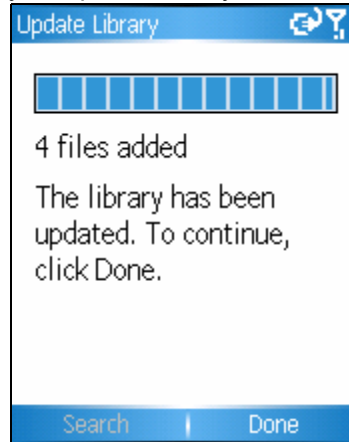
You can use the **Library** screen's menu functions to move from one part of the library to another, update the library and open files. In the **Library** or its sub-folders, press the right softkey to open the **Menu**. The following screen displays.

Figure 19 Windows Media Player: Library Menu

4.3.1.1 Updating the Library.

If you have recently stored new media files on the V660, you need to update the library before you can see them.

In the **Library** screen, select **Menu > Update Media Library**. The V660 searches for new files, and places them in their respective library folders (an audio file will be placed in the **My Music** folder, for example). The following screen displays.

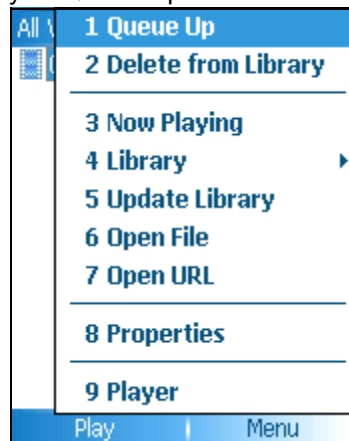
Figure 20 Windows Media Player: Update Library

4.3.1.2 Playing Files from the Library

You can directly select and play files from the library menu. In the Library screen, select **Menu > Open File** (to play a file stored on the V660) or **Menu > Open URL** (to open a file on the Internet).

4.3.1.3 Queue Files to Playlist

To add a media file to the current playlist, first locate the file in the **Library**. Then, select **Menu > Queue Up**. The file is added to the **Now Playing** list.

Figure 21 Windows Media Player: Queue Up

You can also add a whole folder to the playlist by highlighting the folder and selecting **Menu > Queue Up**. All files in the folder are added to the **Now Playing** list.

4.3.1.4 Delete Files from the Library

To delete a file from your V660's memory, highlight the file in the Library and select **Menu > Delete from Library**.



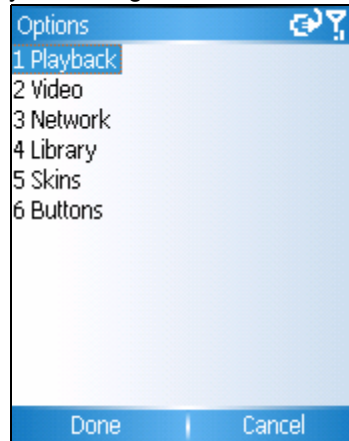
If you do this, the file cannot be recovered.

4.4 Player Settings

Use this section to configure your V660's Windows Media Player. You can change audio and video settings, Internet connection details, how the Player looks (its "skin"), and assign the V660's keys to perform Player functions.

In the **Windows Media** screen, select **Menu > Options**. The following screen displays.

Figure 22 Windows Media Player: Settings

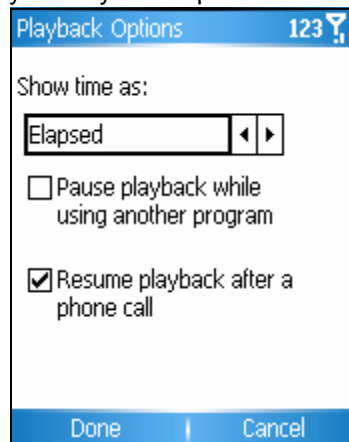


4.4.1 Playback Options

This screen allows you to choose how the Player displays the elapsed or remaining time of a media file, and how it behaves when you are using another program (like Internet Explorer, for example) or making a call.

In the **Media Player** screen, select **Menu > Options > Playback**. The following screen displays.

Figure 23 Windows Media Player: Playback Options



The following table describes the labels in this screen.

Table 7 Windows Media Player: Playback Options

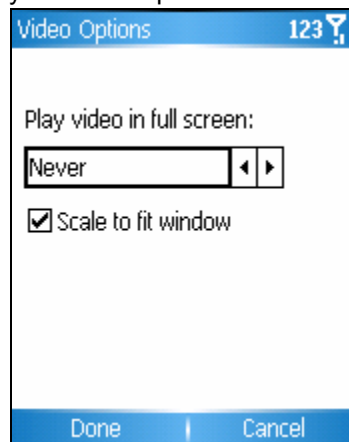
LABEL	DESCRIPTION
Show time as	Choose Elapsed to have the Player display the amount of time that has passed since the beginning of the file. Choose Remaining to have the Player show the amount of time left before the end of the file.
Pause playback while using another program	Select this to have the Player pause playback of a file when you start using another function (except phonecalls). Deselect this to have the player continue playback when you start to use other functions (except phonecalls). You might want to select this if you watch videos on the V660, but deselect it if you listen to music.
Resume playback after a phone call	Select this to have the V660 continue playing a media file that was interrupted by a phonecall. If you deselect this you have to restart the media file manually after finishing a call.

4.4.2 Video Options

This screen allows you to choose how the V660 displays video files.

In the **Media Player** screen, select **Menu > Options > Video**. The following screen displays.

Figure 24 Windows Media Player: Video Options



The following table describes the labels in this screen.

Table 8 Windows Media Player: Video Options

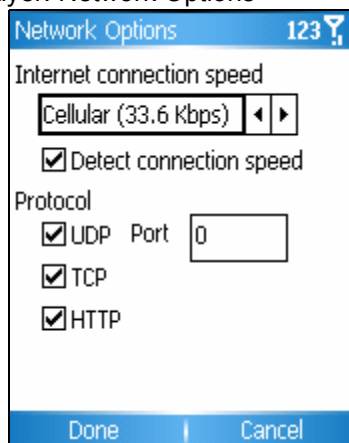
LABEL	DESCRIPTION
Play video in full screen	Select Never to always play video files in a window. Select Only When Oversized to play video files in full screen only when the display area of the video is larger than the screen. Select Always to always play videos in the full screen.
Scale to fit window	Select this to re-size the video display to the size and shape of the window. If the video normally displays in a different shape from the player window (like a wide-screen movie), it may look compressed or stretched when you use this option.

4.4.3 Network Options

This screen allows you to change Internet connection options in order to get better performance when playing audio and video files from the Internet.

In the **Media Player** screen, select **Menu > Options > Network**. The following screen displays.

Figure 25 Windows Media Player: Network Options



4.4.4 Library Options

In the **Media Player** screen, select **Menu > Options > Library**.

This screen allows you to choose whether to go to the Library screen every time you open Windows Media Player. Select the check box to do this. If you deselect the checkbox, the Player opens to the screen at which you last used it.

4.4.5 Skin Options

A skin is a custom file that changes the appearance of a piece of software. If you choose a different skin from the default, Windows Media Player looks different but still works the same.

In the **Media Player** screen, select **Menu > Options > Skins**. Use the navigator to scroll through the available skins, and press **Done** to choose a skin to use.

4.4.6 Button Options

Use this screen to assign your V660's keys to have Windows Media Player functions. For example, if you assign the **Fast Forward** function to the **6** key, you can press that key to fast forward through the media file you are playing.

In the **Media Player** screen, select **Menu > Options > Buttons**. Take the following steps to assign a function.

- 1 Use the navigator to highlight the Player function you want to assign (or re-assign).
- 2 Select **Menu > Assign**.
- 3 Press the key you want to use for this function.

To return all button functions to their default settings, select **Menu > Reset**.

4.5 Audio and Video File Types

The V660's Windows Media Player supports the following file formats:

- Windows Media Video: .wma, .wmv
- MPEG (Moving Picture Experts Group): mp3

Pocket MSN

Pocket MSN allows you to use MSN messenger and Hotmail with your V660. Select **Start > More > Pocket MSN**.

5.1 MSN Messenger

MSN Messenger is an instant messaging system developed by Microsoft. With it, you can freely chat with a group of friends in real time. Select **Start > More > Pocket MSN**.



You need to apply for an account at MSN, Hotmail, or Yahoo to use MSN Messenger.

Figure 26 MSN Messenger



5.1.1 Logging in to MSN Messenger

Before you log in to MSN Messenger, you need to set up your MSN account login (user name) and password.

- 1 In the MSN Messenger screen, press **Sign In**.

- 2 Enter your e-mail address and password in the login screen. Press **Sign In**.

A screenshot of the MSN Sign In dialog box. The title bar is blue with the text "MSN - Sign In" and a small icon on the right. The main area is white and contains the MSN logo at the top. Below the logo are two text labels: "E-mail address:" and "Password:". Each label is followed by a rectangular input field. At the bottom of the main area is a checkbox labeled "Save password". The bottom of the dialog box is a blue bar with two buttons: "Sign in" and "Cancel".

5.1.2 Sending Messages

Once you are logged on to MSN, select a MSN contact to whom you want to send a message. Select **Menu > Send Message**.

5.1.3 Ending a Chat

Select **Menu > End chat** to end the current chat.

5.1.4 Invite a Contact to Participate

You can also invite another person to chat while you are already chatting with a friend. Select **Menu > Invite**, choose a MSN contact and press **Select**.

5.1.5 Contact Blocking

If you block a MSN contact, the contact can neither view your status nor send you messages in MSN.

In the contact list, highlight the contact you want to block and select **Menu > Block**.

To cancel a contact block, select the entry in the **Contact** list and select **Menu > Cancel block**.

5.1.6 Deleting a Contact

In the **Contact** list screen, highlight the contact you want to delete and select **Menu > Delete**.

5.1.7 Changing Your MSN Status

Highlight your MSN ID from the contact list, then click the navigator. Choose the required status from the list that displays.

5.1.8 Changing Your MSN Name

Highlight your MSN ID from the contact list and select **Menu > Options**. Enter your new name in the **My display name** field.



You need to log out of MSN and log back in before changes take effect.

5.1.9 Signing Out of MSN

In the contact list screen, select **Menu > Sign out**.

5.2 Hotmail

Use the Pocket MSN Hotmail service to send and receive e-mail using your existing Hotmail account.

Select **Start > Pocket MSN > MSN Hotmail** to check your Hotmail account.

Select **Start > Pocket MSN > Compose Hotmail** to write a new e-mail.

5.3 MSN Mobile Home

The MSN Mobile Home service is a portal to MSN Web sites. Select **Start > Pocket MSN > MSN Mobile Home**.

Tasks

The **Tasks** function is like a “to do” list. The tasks stored on your V660 can either be entered in manually, or synchronized with Microsoft Outlook on your computer.

6.1 Synchronizing Tasks on Your PC

When you need to synchronize your phone’s tasks with your computer’s Microsoft Outlook task records, first start ActiveSync on your computer.

Connect the computer and your phone with the USB cable. By default, the V660 automatically gets task details from the computer.

6.2 Creating a Task on Your V660

Press **Start** > **Tasks**. The following screen displays.

Figure 27 Tasks



Enter the details of the task in the **Enter new task here** field, and click the navigator to add the task to the list.

When you have completed the task, highlight its entry in the list and press **Complete** to place a tick in the box.

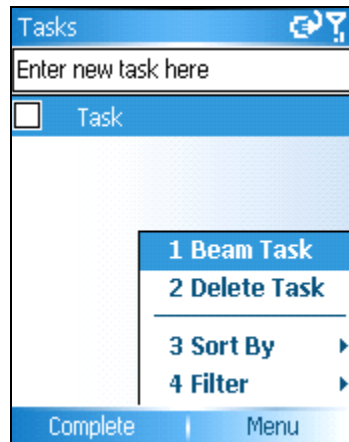


If you want to make changes to schedule or priority, you have to set them in Microsoft Outlook on your computer, then synchronize your V660 with your computer.

6.2.1 Tasks Menu

When you enter Tasks, press **Menu**, as shown below. The following screen displays.

Figure 28 Tasks Menu



The following table describes the labels in this screen.

Table 9 Tasks Menu

LABEL	DESCRIPTION
Beam Task	Send the highlighted task to other storage devices by infrared transfer.
Delete Task	Delete the highlighted task.
Sort by	Sort tasks by status, priority, subject, start date or due date.
Filter	Filter tasks by category (recent, active, completed, or no category).

Calendar

The calendar allows you to create, view and edit appointments, and set reminders.

7.1 Viewing the Calendar

From the Home page, select **Start** > **Calendar**.

You can view the calendar by day, week or month. Press the left softkey to cycle through the views.

7.2 Creating an Appointment

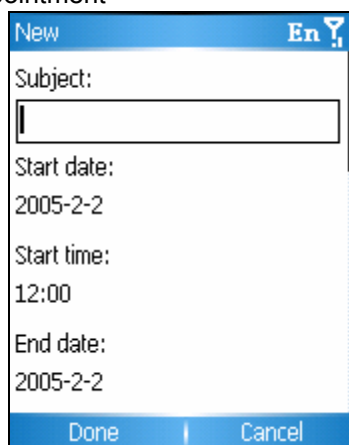
To create a new appointment and add it to the Calendar, take the following steps.

In the Calendar screen, select **Menu** > **Create**. The **New Appointment** screen appears.

Enter the appointment's information in the appropriate fields.

Press **Done** when you are finished.

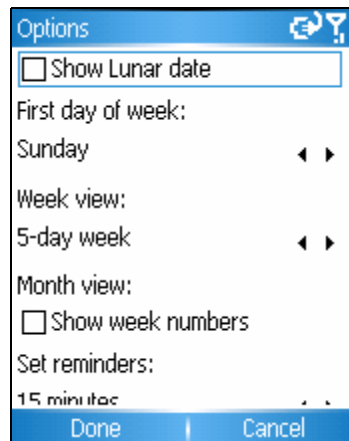
Figure 29 Calendar: New Appointment



7.3 Changing Calendar Settings

Use this menu to choose how the calendar displays. You can also select the length of time before an appointment that the V660 gives you a reminder.

Figure 30 Calendar Options



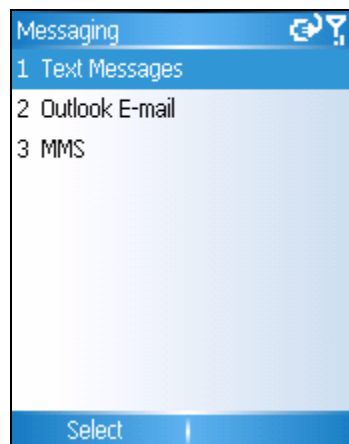
Messaging

The V660 supports three kinds of messaging:

- SMS (Short Message Service). You can send and receive text messages via the cellular phone network.
- MMS (Multimedia Messaging Service). You can send and receive messages that use images, audio, video, and rich text.
- E-mail. You can send and receive e-mail either by connecting to your e-mail server via the wireless network, or by Microsoft Outlook synchronization using ActiveSync.

From the **Home** page, select **Start > Messaging**. The following screen displays.

Figure 31 Messaging



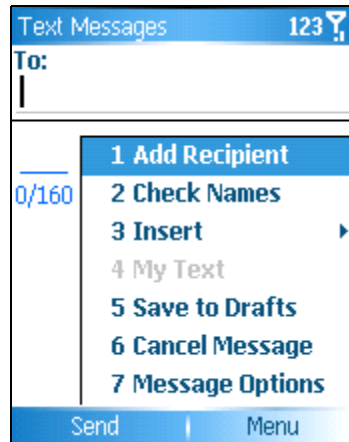
8.1 SMS

SMS is provided by your cellphone service provider, and is used for the transfer of short text messages between cellphones.

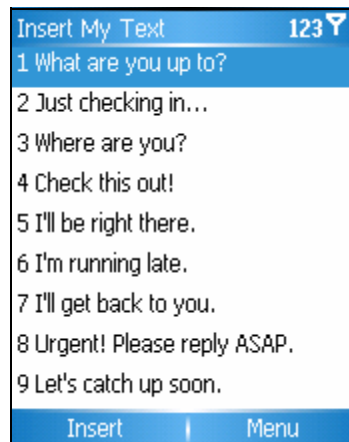
8.1.1 Writing an SMS

Take the following steps to write and send a text message over the cellphone network.

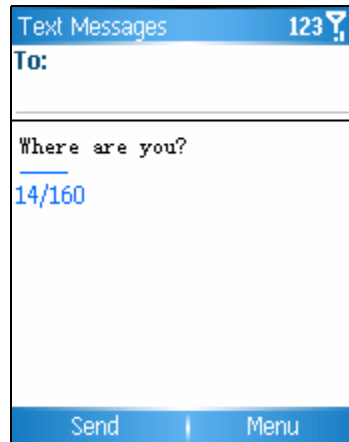
- 1 In the **Messaging** screen, select **Text Messages**. By default, the list of received messages (the **Inbox**) displays. Press **New**.

Figure 32 SMS: New

- 2 Either enter the recipient's phone number manually in the **To:** field, or select **Menu > Add Recipient** and choose a name from the phonebook.
- 3 Scroll down to the message body area using the navigator. Either enter the body text manually, or select **Menu > My Text** to use one of the preconfigured text messages, as shown in the following figure (you can replace the preconfigured text with your own by selecting **Menu > Edit My Text**).

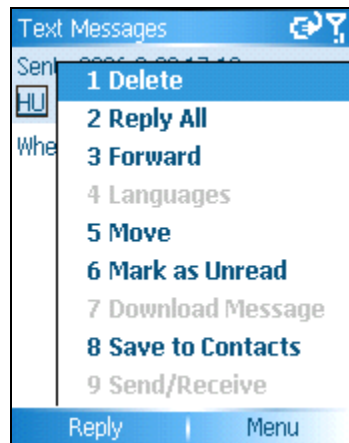
Figure 33 SMS: Preconfigured Text

- 4 When you have finished writing the text message, press **Send** to transmit it. By default, all messages you send are saved in the **Outbox**.

Figure 34 SMS: Send

8.1.2 Reading Text Messages

In the SMS **Inbox** screen, highlight the text message you want to read and click the navigator key. Press **Reply** if you want to compose a message to the person who sent you the message. Alternatively, press **Menu** to delete or forward the message, move it to another folder, mark it as unread, save the number from which the message came to your list of contacts, or reply to all the people to whom the message was sent.

Figure 35 SMS: Menu

8.2 E-mail

The V660 supports sending and receiving e-mail independently over the wireless LAN, as well as when using ActiveSync to synchronize Outlook data with your computer.

Before you can send or receive e-mail, you must do the following:

- Connect to the wireless LAN via an access point. The network to which you connect must itself have Internet access.
- Configure the V660's e-mail account.

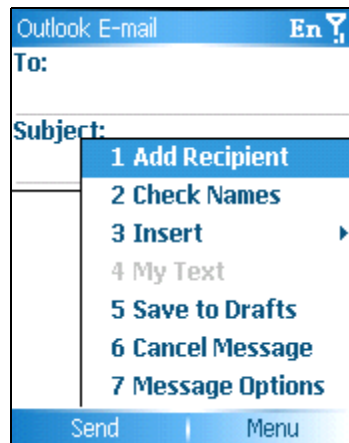
See the chapter on configuring settings for more information.

8.2.1 Writing an E-mail

Take the following steps to write and send an e-mail.

- 1 From the **Messaging** screen, select **Outlook E-mail > New**.
- 2 Either enter the recipient's e-mail address manually in the **To:** field, or select **Menu > Add Recipient** and select the person to whom you want to send the e-mail. You can add multiple recipients this way.

Figure 36 E-mail: Menu



- 3 Use the navigator to scroll down and enter the e-mail's **Subject**.
- 4 Scroll down again and write the body text of the e-mail.
- 5 When you are finished, press **Send**. Alternatively, select **Menu > Save to Drafts** if you do not want to send the e-mail now.

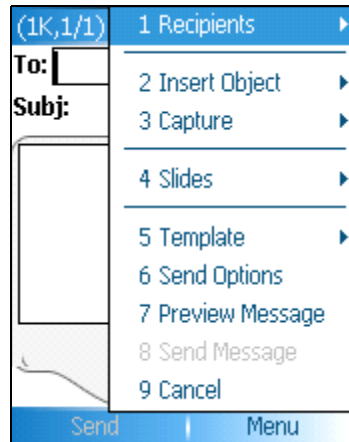
8.3 MMS

Use MMS (Multimedia Messaging Service) to send audio, graphics, video and rich text to other MMS-enabled phones over the cellphone network. Rich text allows you to transmit text formatting (such as bolding, italics, size and color) in a message.

8.3.1 Writing an MMS

Take the following steps to create and send a new MMS.

- 1 In the **Messaging** screen, select **MMS > New**.
- 2 Enter the recipient's phone number in the **To:** field manually, or select **Menu > Recipients > Add** and select the recipient's name from the phonebook. You can add multiple recipients this way.

Figure 37 New MMS: Menu

- 3 Next, use the navigator to scroll down and fill in the **Subject**.
- 4 If you want to add video, or a still picture, scroll down to **Insert Picture/Video...** and click the navigator. Select the file you want to add.
- 5 The **MMS** screen displays again, showing the file you added in step 4. If you want to add text, scroll down to **Insert Text...** and click the navigator. Enter the text and press **Done**.
- 6 The **MMS** screen displays again, showing the graphic file and the text you entered. If you want to add a sound file, scroll down to **Insert Audio...** and click the navigator. Highlight the sound file and press **Select**.
- 7 Press **Send**.

8.3.2 Receiving an MMS

You will be notified if you have a new MMS message. You can view the MMS once it has been completely downloaded onto your V660.

8.4 Message Screen Menus

In the SMS, MMS or E-mail screen, press **Menu**. The following table describes the labels in the screen that appears.

Table 10 Message Screen Menu

LABEL	DESCRIPTION
Delete	Use this to delete the current message.
Reply	Use this to reply to the current message, reply to all recipients of the current message, or forward the current message to another person.
Folders	Use this to switch to other message folders (Drafts, Outbox, Inbox, Sent Items, and Deleted Items).
Switch accounts	Use this to switch between SMS, E-mail, and MMS account.
Move	Use this to move the current message to another folder.
Mark as read	Use this to indicate that the current message has been read.
Download Messages	This option is available in the E-mail menu only. When your V660 receives an e-mail, it automatically downloads only the subject line. Use this option to download and view the rest of the e-mail.

Table 10 Message Screen Menu

LABEL	DESCRIPTION
Option	Use this to change account details, or the way your V660 sends and displays messages.
Send/Receive	Use this to get any new messages and send any waiting messages from your V660.

8.5 Message Folders

Your V660's SMS, MMS and E-mail message systems each have the following folders: Inbox, Outbox, Draft, Sent and Deleted Items.



In order to conserve storage space, it is strongly recommended that you often go through your folders and delete the messages you do not want to keep.

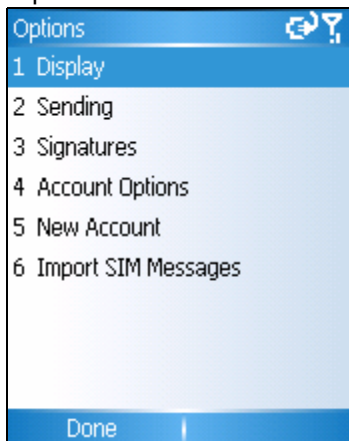
If the V660 runs out of storage space, functions like sending, saving and downloading messages become unavailable. If this happens, free up some storage space by deleting unwanted messages.

- Draft
All incomplete, unsent or ready-to-be-sent messages are saved here.
- Outbox
All messages that the V660 failed to send are stored here.
- Inbox
All received messages are stored here.
- Sent Items
All successfully sent messages are saved here. If you enable the MMS auto save function, MMS messages you send are saved here.
- Deleted Items
Messages you delete are saved here. If you then delete them from this folder, they are permanently lost.

8.6 Changing Messaging Options

You can change the way your V660 displays and sends messages, and its message account settings.

In the **SMS**, **E-mail** or **MMS** screen, select **Menu > Options**. The following screen displays.

Figure 38 Messaging: Menu > Options

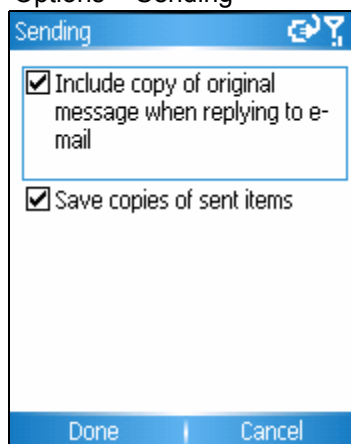
8.6.1 Message Display

Use this screen to select whether or not to display time and date information in the message list, and to set up the way you want messages to be shown on the screen.

Figure 39 Messaging: Menu > Options > Display

8.6.2 Message Sending

You can choose whether or not to include the content of the prior e-mail in a reply e-mail, and whether or not to backup the e-mails you send.

Figure 40 Messaging: Menu > Options > Sending

8.6.3 Signatures

A signature is a short piece of text that is automatically added at the end of a message. Use this screen to set up signatures for SMS, MMS or e-mail.

Messaging: Menu > Options > Signatures



8.6.4 Account Options

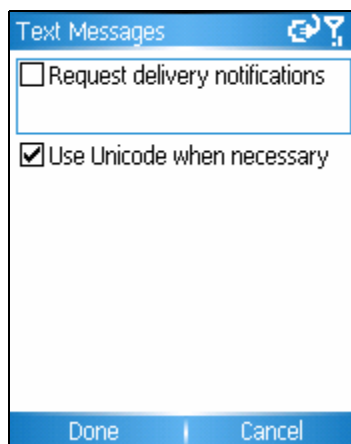
The options available depend on whether you are configuring e-mail, SMS or MMS.

8.6.4.1 E-mail Options

When you select **Account Options** from your V660's e-mail menu, you can see and change the settings the V660 uses to connect to an e-mail server. See [Section 8.6.5 on page 76](#) for descriptions of the fields in these screens.

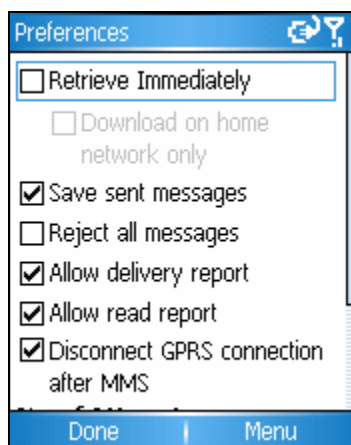
8.6.4.2 SMS Options

When you select **Account Options** from your V660's SMS menu, the following screen displays. You can choose whether to have your service provider send you delivery notifications (a report that it has successfully forwarded a message to a recipient), and whether or not to use Unicode (Unicode allows messages in non-Latin character sets like Russian or Chinese to display properly).

Figure 41 SMS Options

8.6.4.3 MMS Options

When you select **Account Options** from your V660's MMS menu, the following screen displays.

Figure 42 MMS Options

The following table describes the labels in this screen.

Table 11 MMS Options

LABEL	DESCRIPTION
Retrieve Immediately	Select this to download MMS messages as soon as they are received.
Download on home network only	Select this to download MMS messages immediately only if you are using your service provider's own network.
Save sent messages	Select this to automatically save MMS messages you send.
Reject all messages	Select this to turn MMS message reception off.
Allow delivery report	Select this to have your service provider send you a report that it has successfully forwarded a message to a recipient.
Allow read report	Select this to have your service provider send you a report letting you know that a message's recipient has read the message.
Disconnect GPRS connection after MMS	Select this to stop using the GPRS connection when you are not using the MMS service.

Table 11 MMS Options

LABEL	DESCRIPTION
No. of Attempts	Choose the number of times your V660 tries to send an MMS.
Photo Resolution	Select the size that photos display on the V660. The smaller the size, the less storage space the MMS uses.

8.6.5 New Account

You can set up an e-mail account here in order to send or receive e-mail. The V660 supports POP3 and IMAP4.

Take the following steps to set up the V660 to use your e-mail account. If you do not know the information required for any of these steps, consult your e-mail provider.

In the **E-mail** screen, select **Menu > Options > New Account...** In the screen that displays, select **Outlook E-mail** if you want to set up an account that synchronizes with Microsoft Outlook on your computer. Otherwise, select **Other (POP3/IMAP)**. Press **Next**.

8.6.5.1 Outlook E-mail Account

If you selected **Outlook E-mail**, take the following steps to configure your account in the screen that displays.

- 1 Enter your e-mail server's address. Select **This server requires an encrypted (SSL) connection** if you were told to do so; otherwise leave it unselected.
- 2 In the next screen, enter the **User name** and **Password** for this account. Enter the **Domain** if your e-mail provider told you to do so. Select **Save password** if you do not want to enter the password each time you log on to the e-mail server. Press **Next**.
- 3 In the next screen, choose the types of data you want to synchronize with Microsoft Outlook. If unsure, leave this screen at its default settings. Press **Finish**.

8.6.5.2 POP3/IMAP Account

If you selected **Other (POP3/IMAP)**, take the following steps to configure your account in the screen that displays.

- 1 Enter your name and e-mail address. Select **Attempt to obtain e-mail settings from the Internet** if you want the V660 to try to get your settings automatically. Otherwise, leave it unselected.

Figure 43 E-mail Account: Setup

E-mail Setup En ?

Your name:
mengboyu

E-mail address:
mengboyu@sohu.com

Automatic setup:
☒ Attempt to obtain e-mail settings from the Internet.

Cancel | Next

- 2 If you selected **Attempt to obtain e-mail settings from the Internet**, the following screen displays. Wait for the V660 to finish connecting.

Figure 44 E-mail Account: Auto Setup

Auto Setup ?

Attempting to obtain e-mail settings for sohu.com.

Select Next to skip this step and enter your settings manually (recommended for corporate e-mail)

Connecting...

Previous | Next

- 3 If the V660 successfully obtained e-mail settings, you can use your e-mail account once you have entered your user name and password. If the V660 did not obtain settings, you need to enter your settings manually. Press **Next** to continue.
- 4 The following screen displays. Enter the user name and password you use to access your e-mail. Enter your e-mail account's domain name if it is different from the domain name of the e-mail address you entered in step 1, or you have specific instructions to do so. Select **Save password** if you do not want to enter the password each time you log on to the e-mail server. Press **Next**.

Figure 45 E-Mail Account: Authentication

E-mail Setup En

User name:
mengboyu

Password:

Domain (if necessary):

☐ Save password

Previous | Next

- 5 Select the type of server (**POP3** or **IMAP4**) that your e-mail provider uses, and enter the associated **Account name**. If unsure, consult your e-mail provider. Choose the kind of network you will use to access your e-mail. If unsure, select **The Internet** if you are connected to a wireless access point, or **WAP network** if you want to connect via your cellphone service. Press **Next**.

Figure 46 E-Mail Account: Server and Network Setup

E-mail Setup 123

Server type:
POP3

Account name:
POP3

Network:
The Internet

Previous | Next

- 6 In the next screen, enter the address of the **Incoming Server** and **Outgoing Server**. If you want to use encryption to secure incoming e-mail, select **Require SSL connection**. If your outgoing server requires you to provide a user name and password for access, select **Outgoing server requires authentication** and click **Outgoing Server Settings**. Enter the authentication details for the outgoing server in the screen that appears. Press **Next**.

Figure 47 E-mail Account: Incoming and Outgoing Servers

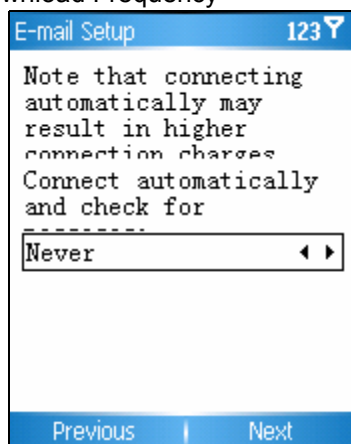
The screenshot shows the 'E-mail Setup' screen. At the top, it says 'Incoming Server:' followed by 'pop3.sohu.com'. Below that is a checkbox labeled 'Require SSL connection'. Then it says 'Outgoing Server:' followed by an empty text box. Below the text box is another checkbox labeled 'Outgoing server requires authentication'. At the bottom, there is a blue bar with 'Previous' and 'Next' buttons. A small 'En' icon with a question mark is in the top right corner.

- 7 The next screen allows you to control the amount of data you download from the e-mail server. You can do this by selecting the number of days' e-mail you want to download, and also by select the amount of each e-mail you want to initially download. If you are not concerned about the amount of memory your e-mail takes up, Select **All messages** and **Entire message**. Press **Next**.

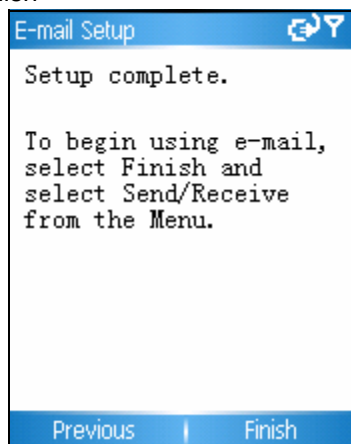
Figure 48 E-Mail Account: Download Control

The screenshot shows the 'E-mail Setup' screen. At the top, it says 'Download the following messages:'. Below that is a dropdown menu showing 'Last 3 days of e-mail'. Below the dropdown is a text box showing 'First 500 bytes'. At the bottom, there is a blue bar with 'Previous' and 'Next' buttons. A small '123' icon with a question mark is in the top right corner.

- 8 In the next screen, select how often you want the V660 to automatically connect to the e-mail server and check for mail. Bear in mind that you may be charged for this by your service provider.

Figure 49 E-Mail Account: Download Frequency

- 9 Your e-mail setup is complete. Press **Finish** and then select **Menu > Send/Receive** to have the V660 connect to the e-mail server.

Figure 50 E-Mail Account: Finish

Contacts

This chapter discusses how to create, modify and manage your Contacts list. The **Contacts** list consists of records where you can store information about people or businesses. The list allows you to store multiple phone numbers, e-mail and street addresses, important dates, and so on. You can make phonecalls and compose e-mail and SMS messages directly from a contact's entry in the list.

9.1 Creating a Contact

In the **Contacts** list, press **New**. Fill in the fields, then press **Done** to save the information. The contact is added to the list.

Figure 51 Contacts: New Contact

You can also create a Contact list entry from a phone number in a SMS or MMS message, an e-mail or a Web page.

9.1.1 Inserting a Pause

When you enter a phone number that uses an extension number, or an international number, you may need to have the V660 pause for a while before it dials the extension, or the part of the number after the international code. You can do this by selecting the place where you want a pause, pressing **Menu** and selecting **Insert Pause**. A “p” appears. For example, if you want the V660 to dial the phone number “555 123456” and then wait before dialing the extension number “123”, enter the number as “555123456p123”. If you need to insert a longer pause, you can add more “p”s.

9.1.2 Entering a Number Manually

If you want to manually enter a number after dialing a contact, for example if you want to call a company's switchboard and then decide which extension to dial, select **Insert wait** from the **Menu**.

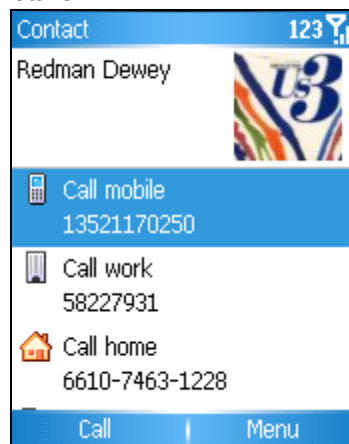
9.2 Viewing a Contact's Information

In the **Home** page, press **Contacts**. The Contacts list displays. Contacts stored on the SIM card (if installed) are displayed here, as are those stored on the V660 itself. Contacts stored on the V660 appear before those stored on the SIM card.

The Contacts list displays your contacts' names alphabetically, and shows an abbreviation for the default contact method. For example, if "w" displays next to a contact's name, pressing the **Talk** key dials the stored work phone number for this contact. If a "H" displays, the home number is the default, and if an "M" displays, the mobile number is the default. If the contact's information is stored on the SIM card instead of on the V660 itself, a SIM card icon displays to the left of the entry.

Select a contact and press **OK** to view the details.

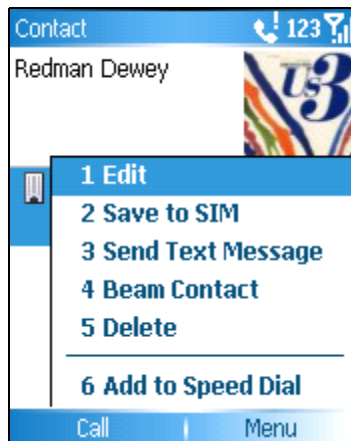
Figure 52 Contacts: Contact Details



9.3 Modifying a Contact's Information

Take the following steps to change a contact's information.

In the **Contacts** list, highlight an entry and select **Menu > Edit**.

Figure 53 Contacts: Edit Contact Details

9.4 Creating a Contact on Your SIM Card

You may want to create a contact record on your SIM card if you intend to use the SIM card on more than one phone.



Generally, SIM card records can hold only a name and a number. Consult your cellphone service provider if unsure.

Take the following steps to create a SIM card contact.

In the Contact list, select **Menu** > **Create a SIM contact**.

Figure 54 Contacts: SIM Contact

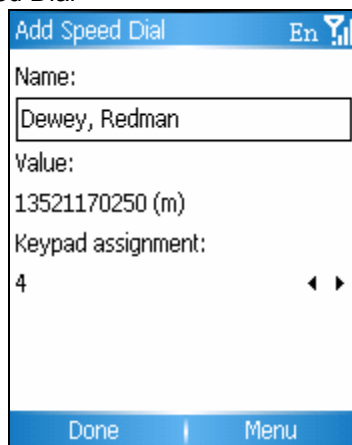
 A screenshot of the 'SIM Contact' form. The form has a title bar 'SIM Contact' with a search icon. It contains two input fields: 'Name:' and 'Number:'. The 'Name' field is a single-line text box, and the 'Number' field is a multi-line text box. At the bottom of the screen, there are 'Done' and 'Menu' buttons.

9.5 Adding Speed Dial

You can assign a one- or two-digit speed dial number to a contact's entry. When you enter this number from the **Home** screen, the V660 automatically dials the contact.

- If you assign a single digit number, press and hold the digit's key.
- If you assign a two-digit number, quickly press the first digit's key, then press and hold the second.
- To assign a speed dial number, go to the **Contacts** list, highlight the contact's entry and click the navigator. In the screen that displays, select **Menu > Add to speed dial**. Scroll down to **Keypad assignment** and enter the one- or two-digit number you want to use. Press **Done**.

Figure 55 Contacts: Add Speed Dial



9.6 Finding a Contact

From the **Contacts** list, you can do the following to locate an entry.

Use the navigator to scroll up and down the list.

Press a number key. The V660 highlights all entries containing that number, or the letters you enter using that key. For example, if you press the **3** key, the V660 highlights all entries containing “3”, “d”, “e”, or “f” in the name or the default phone number.



If your SIM card is password-protected, you need to enter the password before you can see its entries in the Contact list.

9.7 Beaming Contacts

You can beam (transmit) contacts to other infrared-capable devices. Do the following:

In the Contact list, select **Menu > Send contact > Beam**, aim the infrared interface on your phone at the other infrared device (or devices), then press **Beam** to start transferring.

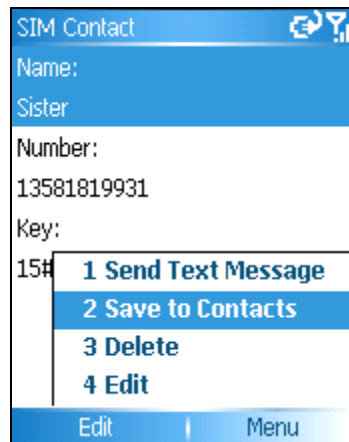
9.8 Copying Contacts

You can copy contacts from the SIM card to the V660, and vice versa.

9.8.1 Copying a SIM Contact to the V660

In the Contact list, highlight a SIM contact and click the navigator. Click **Menu > Save to Contacts**. Enter any new contact details, and press **Done**. The contact is added to the V660's list, and remains on the SIM card.

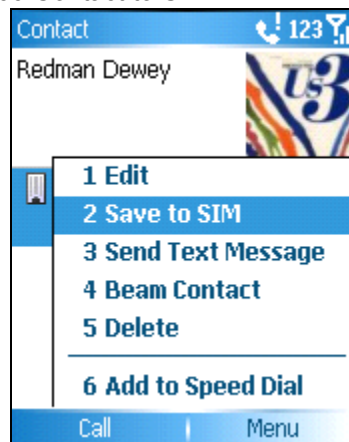
Figure 56 Contacts: Copy SIM Contact to V660



9.8.2 Copying a V660 Contact to the SIM Card

In the Contact list, highlight a V660 contact and click the navigator. Click **Menu > Save to SIM**. Because you can save only one phone number in a SIM card entry, the V660 automatically selects the contact's default phone number. Press **Done**.

Figure 57 Contacts: Copy V660 Contact to SIM



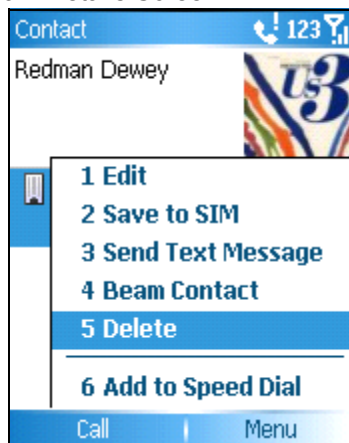
9.9 Deleting Contacts

Use either the **Contacts** list or the contact's details screen to delete a contact's information.

Figure 58 Contacts: Delete From Contacts List



Figure 59 Contacts: Delete From Details Screen



Speed Dial

Use this screen to manage all speed dial settings on the V660. Select **Start > More > Speed Dial**.

The **Speed Dial** screen displays details of all speed dial rules configured on the V660.

- Highlight a speed dial rule and click the navigator to view and edit the rule's details.
- Highlight a speed dial rule and press **Go** to call the phone number. Alternatively, select **Menu > Run**.
- Highlight a speed dial rule and select **Menu > Find Contact** to look at the contact's record.
- Highlight a speed dial rule and select **Menu > Delete** to remove the rule.



See [Section 9.5 on page 84](#) for more information on dialing speed dial numbers.

ActiveSync

When you connect your V660 to a PC with the USB cable, you can use Microsoft® ActiveSync® to synchronize data between the two devices. ActiveSync automatically compares data on the PC and your phone to check if synchronization is needed.

11.1 Synchronizing Data

By default, your contacts, schedule, and other tasks in Microsoft Outlook Express will all be copied to the V660. When you do this, you can view all the information on your phone in the same way as you do on your computer. Before synchronization can begin, you must install Active Sync 3.7 or above on your desktop or notebook PC.

11.1.1 Installing ActiveSync

ActiveSync is already installed on the V660. If your computer does not have ActiveSync already installed, install it using the CD that came with your V660. Alternatively, download ActiveSync for free from Microsoft's Web site.

11.2 Using ActiveSync

11.2.1 Synchronize With the Computer

After you install the ActiveSync software on your computer, use the included USB cable to connect your V660 to the computer.

In the ActiveSync function screen, select "Synchronization" to start the synchronization process. Select "Stop" to end the synchronization process.

11.2.2 ActiveSync Server

Before synchronizing information with a server, make sure all the necessary server authentication information such as user name, password, and the name of the Microsoft Mobile Information Server are correct.

Do the following to set up ActiveSync Server

- 1 In the V660's **ActiveSync** screen, select **Menu > Options > Server settings > Connect**.
- 2 In the **User name** field, enter your Microsoft Exchange user name.
- 3 In the **Password** field, enter your Microsoft Exchange password.

- 4** In the **Domain** field, enter the name of the domain of your Exchange server (if required).
- 5** In the **Server name** field, enter the name of mobile information server you want to connect to.
- 6** Press **OK** to finish setup, then press **Start** to synchronize.



After a connection has been set up between the V660 and your PC, a long-distance connection with the server is also available.

11.3 Synchronizing Information

11.3.1 Synchronizing Inbox

When you synchronize the e-mail stored in the inbox of the computer with those stored on the server, the system synchronizes only the mails received in the most recent three days, and synchronizes only the initial 500 bytes of each e-mail. If you want to read all of an e-mail that is more than 500 bytes long, you need to download the full e-mail.

The mails stored in the V660 and in the computer are synchronized. If you delete an e-mail on the V660 or on the computer, the other device will delete this e-mail automatically the next time you synchronize the two.

To synchronize the other files in Outlook and mails in customized directories, you need to select and highlight these directories in the V660.



SMS and MMS cannot be synchronized.

11.3.2 Synchronizing Schedules

You can synchronize schedules stored in the V660 with those stored in Outlook, or Mobile Information Server 2002 and more recent versions.

By default, only the schedules for the past two weeks and future schedules are synchronized.

11.3.3 Synchronize Contacts

By default, all contacts are synchronized.

When you synchronize the V660 with your computer, contact records newly created or deleted on the phone or the computer will be correspondingly created or deleted on the other device.

11.3.4 Installing Software on the V660

You can install software on the V660 by using ActiveSync function on the computer. Take the following steps to do this.

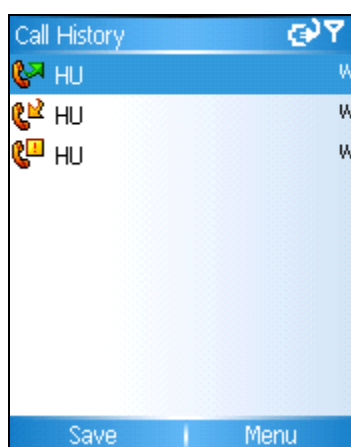
- 1** Build a connection between the phone and the computer by using ActiveSync.
- 2** Run the software's setup file on the computer.
- 3** Select the setup location on the V660 and begin to install the software. If the Memory card has been inserted into the phone, the system will ask you to choose the storage location.

Call History

The V660's **Call History** records information such as phone number and call time.

Press **Start** > **Call History**. The following screen displays.

Figure 60 Call History



Each entry in the **Call History** list has an icon to its left, indicating the type of call.

Table 12 Call History Icons

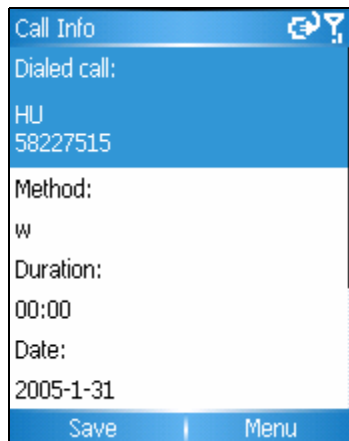
ICON	DESCRIPTION
	Outgoing call
	Incoming call
	Missed Call



If a phone number is configured as part of a **Contacts** list record, the contact's name displays in the **Call History** list. Otherwise, the phone number displays.

12.1 Viewing Call History Details

In the **Call History** list, highlight an entry you want to view. Press **OK** to view details.

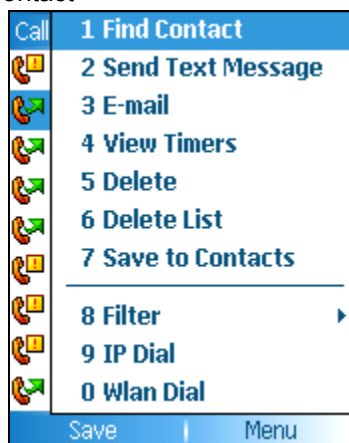
Figure 61 Call History: Details

12.2 Saving a Phone Number

In the **Call History** screen, highlight an item you want to save. Press **Save**. The **Contacts** list displays the new entry as <New item>. Press **Select** and enter the contact's details. Press **Insert** to paste the phone number into a field.

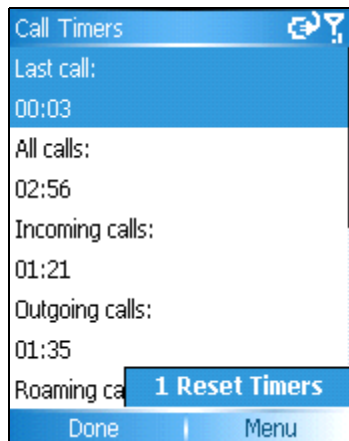
12.3 Finding a Contact

If you want to view other information about a contact from **Call History**, select **Menu > Find Contact**. If no number or name matches a **Contacts** list entry, an error screen displays.

Figure 62 Call History: Find Contact

12.4 Viewing Timers

The **Call Timers** function allows you to view the time of all different types of call. In the **Call History** screen, select **Menu > View Timers**. The following screen displays.

Figure 63 Call History: Call Timers

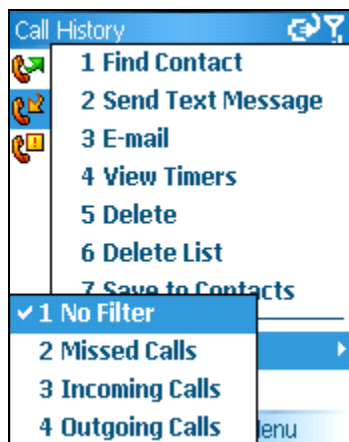
Select **Menu > Reset timer** to clear out all time records except for **Lifetime Calls**.

12.5 Deleting Call History Entries

In the **Call History** list, select **Menu > Delete** to delete the highlighted entry, or select **Menu > Delete List** to delete the entire **Call History** list.

12.6 Call History Filter

In the **Call History** list, select **Menu > Filter** to see entries for the specified call type only.

Figure 64 Call History: Filter

12.7 Call from Call History

You can call a **Call History** entry's phone number by highlighting the entry and pressing the **Call** key.

If you want to make a VoIP call to a number that does not start with a "#", select **Menu > WiFi Call**.

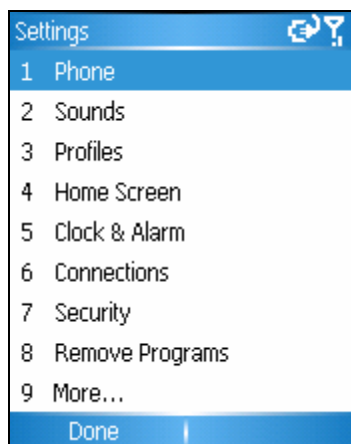
Settings

The settings screens allow you to make changes to your V660, and configure its features.

Select **Start** > **Settings**. The following screen displays.

Select **More** to go to the next page of settings.

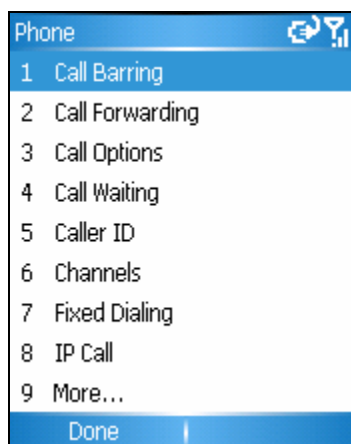
Figure 65 Settings



13.1 Phone

Select **Start** > **Settings** > **Phone**. The following screen displays.

Figure 66 Settings: Phone



The following sections describe the options available in this screen.

13.1.1 Call Barring

You can bar certain incoming calls or outgoing calls. You may need to enter a passcode each time you use this function. You can get this passcode from your service provider.



If you enter the call barring password incorrectly three times consecutively, the call barring function will be locked and cannot be used.

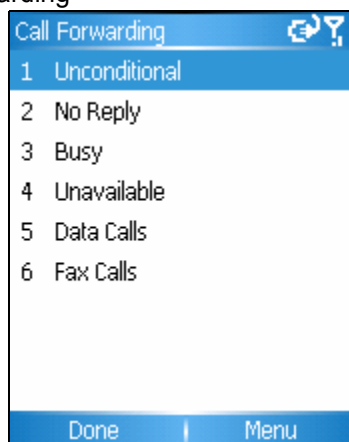


Call barring functions require network support. If call barring does not work, check with your service provider.

13.1.2 Call Forwarding

You can set your V660 to divert calls to other phones under certain conditions.

Figure 67 Settings: Call Forwarding



Call forwarding functions require network support. You may need to subscribe to these services. If call forwarding does not work, check with your service provider.

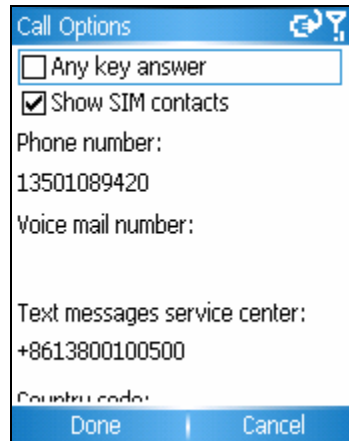
13.1.3 Call Options

This screen allows you to configure the following.

- Whether to use **Any key answer** (pressing any of the V660's keys when the phone is ringing answers the call).
- Whether to show the contacts stored on your SIM card in the **Contacts** list.

- Which line to use for outgoing calls (if available).
- Phone numbers for each line (if available)
- Voicemail numbers.
- Text message service centre number.
- Country code and area code.

Figure 68 Settings: Call Options

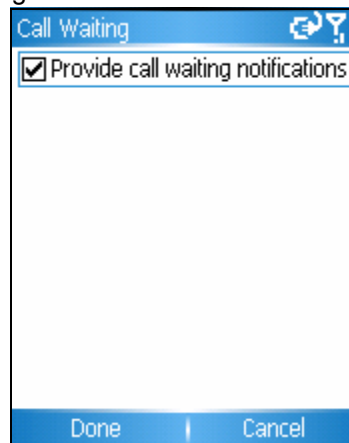


13.1.4 Call Waiting

Use this screen to switch call waiting notifications on or off. Call waiting notifications let you know if someone is trying to call you when you are already making a call.

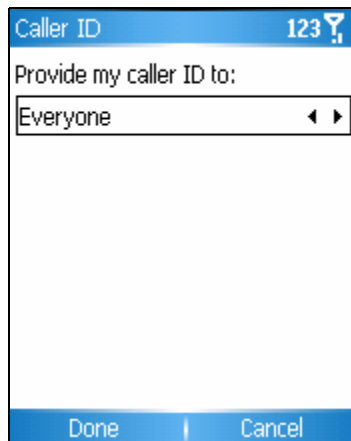
This screen applies to calls over the cellphone network only. Configure call waiting notifications for VoIP calls in **Settings > WiFi Call Waiting**.

Figure 69 Settings: Call Waiting



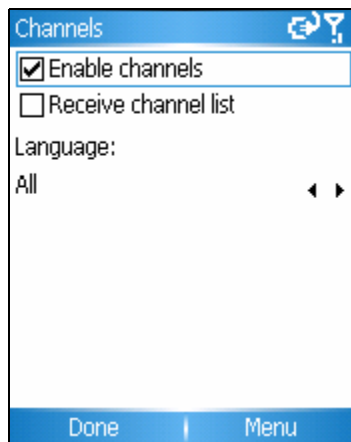
13.1.5 Caller ID

When you send caller ID, you let people you call know who is calling before they answer. You can choose whether to send caller ID for all calls, only when you call someone on your **Contacts** list, or never.

Figure 70 Settings: Caller ID

13.1.6 Channel

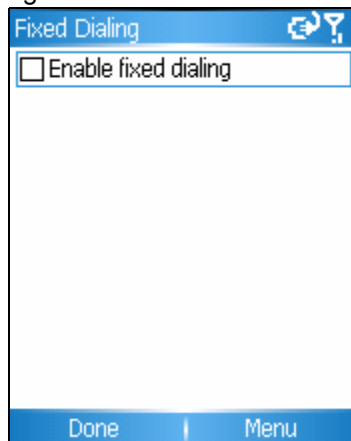
Use this screen to receive lists of information channels supplied by your cellphone service provider. You can select the language of the channels you want to receive.

Figure 71 Settings: Channels

This function requires support from your cellphone service provider.

13.1.7 Fixed Dialing

Fixed dialing allows you to restrict your outgoing calls (and messages). When this is switched on, you can call only numbers on your fixed dialing list. Select **Menu > Edit Numbers** to see, add, modify or remove phone numbers from the **Fixed Dialing** list.

Figure 72 Settings: Fixed Dialing

This function requires support from your cellphone service provider.

13.1.8 Network

Use this screen to either view the name of the current cellphone network, set the way the V660 chooses the network to use, or search for a network manually. Use the **Menu** to locate a new network, select a specific network or set the network that you prefer to use.

Figure 73 Settings: Network

Not all functions are supported by all networks. If you are unsure whether the network you use supports these functions, please consult your service provider.

13.1.9 WiFi Call Forwarding

Use this screen to set up call forwarding for incoming VoIP calls to other phone numbers under certain conditions. To set up WiFi call forwarding, select the condition you want to configure, select the check box and enter the phone number to which you want to forward calls.

Figure 74 Settings: WiFi Call Forwarding

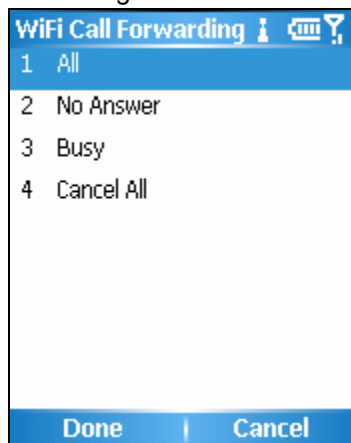
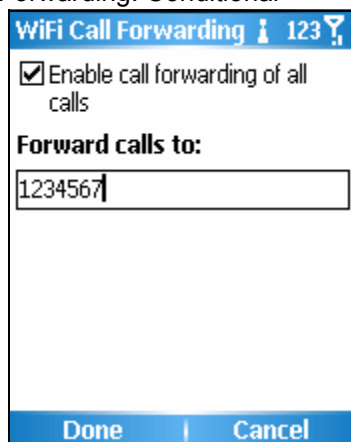


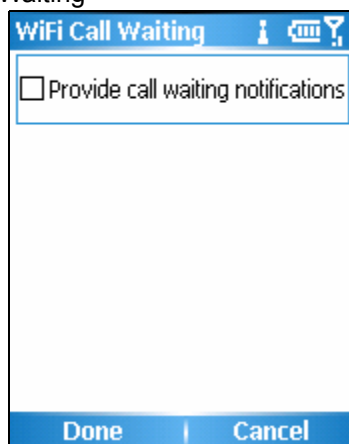
Figure 75 Settings: WiFi Call Forwarding: Conditional



This function requires support from your cellphone service provider.

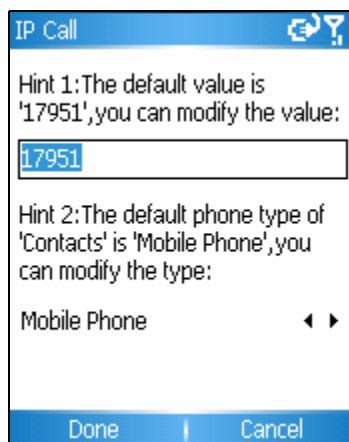
13.1.10 WiFi Call Waiting

Use this screen to switch call waiting notifications for VoIP calls on or off. Call waiting notifications let you know if someone is trying to call you when you are already making a call.

Figure 76 Settings: WiFi Call Waiting

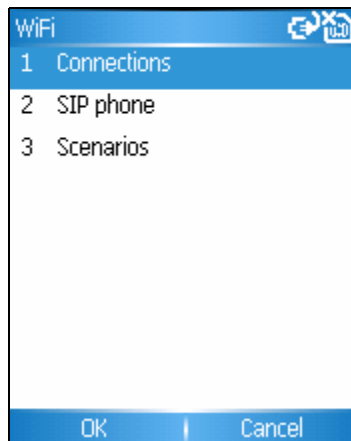
13.1.11 WiFi & IP Dial Prefix Setting

Use this screen to configure the prefix number the V660 dials before making an IP call. Select **Settings > Phone > More... > WiFi&IP Dial Prefix Setting > IP Call Prefix Settings**.

Figure 77 Settings: IP Call

13.2 WiFi

Select **Start > Settings > WiFi**. The following screen displays.

Figure 78 Settings: WiFi

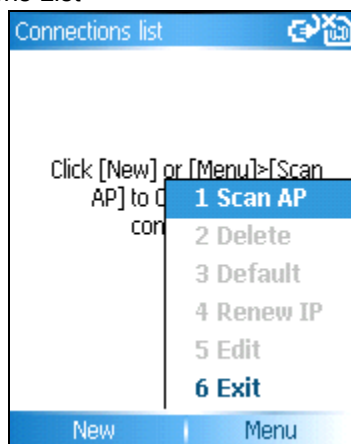
The following sections describe how to configure these screens.



WLAN (Wi-Fi) is the default wireless channel setting for your device. However, GPRS starts by default if your device does not detect any Wi-Fi signal.

13.2.1 Wi-Fi Connection

Select **Start > Settings > Wi-Fi > Connections**. The following screen displays.

Figure 79 Settings: Connections List

Either press **New** to create a new wireless LAN connection profile (there does not need to be an active access point to do this) or select **Menu > Scan AP** to have the V660 search for available access points.

The V660 can store and use up to sixteen WiFi connection profiles. One connection profile is the default, which the V660 always uses if the relevant AP is available. If the default profile's AP is not available, the V660 uses the profile whose AP has the strongest signal. You can change which profile is the default by selecting **Menu > Default** in this screen.

13.2.1.1 New WiFi Connection Profile

When you select **New** in the **Connections List** screen, the following screen appears.

Figure 80 Settings: New Connections Setting

The following table describes the labels in this screen.

Table 13 New WiFi Connection Profile

LABEL	DESCRIPTION
Name	Enter a name for this connection profile. This does not need to be the same as the ESSID .
ESSID	Enter the Extended Service Set Identifier, or “network name” of the access point you want to connect to.
Security	Select the security method the access point you want to connect to uses. Fill in the fields that appear with your authentication information. The V660 supports WEP , WPA , WPA-PSK and 802.1x security.
IP setting	The MAC field shows the Media Access Control address of the V660. All networking devices have a factory-assigned MAC address, which uniquely identifies them on the network. Do not change this unless you need to spoof the MAC address of another device. If your V660 is a DHCP client (it can get its IP address settings from the network) select DHCP. Alternatively, if you have IP information to use, ensure DHCP is not selected and enter the information in the relevant fields. If you are not sure, try using DHCP. If this does not work, contact your network administrator.

13.2.1.2 Scan AP

When you select **Start > Settings > WiFi > Menu > Scan AP**, the V660 begins to search for available access points. This may take a short while. When the scan is complete, the V660 shows a list of access points in the area.

An icon next to each access point shows the received signal strength, and a “lock” symbol appears if the AP has security active.

When you select an AP from the list, the V660 creates a new profile using this AP.

If the AP has security active, you still need to enter your authentication details. Select the profile and enter the details as in [Section 13.2.1.1 on page 105](#).

13.2.2 SIP Phone

Before you can use the SIP phone feature, you need to set up a SIP phone profile. Take the following steps to do this.

- 1 Click **Start** > **Settings** > **WiFi** > **SIP Phone**. Press **New**.

Settings: SIP Phone Account Settings.

- 2 In the **Name** field, specify a name for your SIP Phone.
- 3 In the **SIP phone account** section, fill in the information as supplied by your VoIP provider, such as User name, Password, Server address, Port, Proxy, and Proxy port. Consult your VoIP provider if unsure about the information to enter in any of these fields.
- 4 Leave the **Codec**, **Advanced** and **STUN** settings at their default values unless you have a specific reason to do otherwise (see [Section 13.2.2.1 on page 106](#), [Section 13.2.2.2 on page 107](#) and [Section 13.2.2.3 on page 108](#)).
- 5 Press **Done**. The SIP Phone screen appears. The new SIP phone profile displays. If you have more than one SIP phone profile, highlight the one you want to use as the default and select **Menu** > **Default**.

To make VoIP calls, press # before entering the phone number. For example, if you want to call “55512345” using your SIP phone profile, go to the **Home** screen, enter #55512345” and press the **Call** key. You do not need to have a SIM card installed in the V660 to do this.

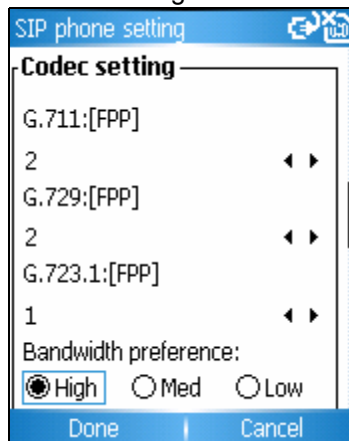
13.2.2.1 Codec Settings

A voice codec (compressor / decompressor) is software that converts analog audio into a digital signal, and vice versa.

When you make a VoIP call, your V660 and the SIP server must use the same codec.

You can change the codec settings in order to optimize the voice quality of your VoIP calls. However, it is suggested that you leave the settings at their default values.

Select **Start** > **Settings** > **WiFi** > **SIP Phone** and either press **New** or highlight an existing profile and select **Menu** > **Edit**. Scroll down to the **Codec setting** section.

Figure 81 Settings: SIP Phone Codec Settings

FPP refers to the number of Frames Per Packet. Each frame contains a set number of digital samples, and each audio data packet the V660 sends and receives can contain a number of frames. Use the settings supplied by your VoIP service provider. If you are experiencing VoIP call problems, try using a lower FPP number.

When you make a SIP call, the V660 and the SIP server negotiate which voice codec they use for the call. The **Bandwidth preference** field controls the order in which the V660 tries to use the codecs, as shown in the following table.

Table 14 Bandwidth Preference Codec Ordering

PREFERENCE	ORDER
High	G.711 μ -Law, G.711 A-Law, G.729, G.723 (not supported at the time of writing)
Med	G.729, G.723, G.711 μ -Law, G.711 A-Law
Low	G.723, G.729, G.711 μ -Law, G.711 A-Law

13.2.2.2 Advanced Settings

Select **Start** > **Settings** > **WiFi** > **SIP Phone** and either press **New** or highlight an existing profile and select **Menu** > **Edit**. Scroll down to the **Advanced setting** section.



Alter these settings only if you have instructions to do so from your VoIP service provider.

Figure 82 Settings: SIP Phone Advanced Settings

SIP phone setting

Advanced setting

DTMF payload:
101

Call prefix:

Server type:

SIP listen port:
8468

Done | Cancel

The following table describes the labels in this screen.

Table 15 Settings: SIP Phone Advanced Settings

LABEL	DESCRIPTION
DTMF Payload	Enter the payload number that is used for Dual-Tone Multi-Frequency information (according to RFC2833).
Call prefix	The number specified in this field will be added in front of calling number. Some service providers require a prefix number to access certain services.
Server	Certain server types require the phone to perform non-standard processes. Enter the type of SIP server your service provider uses.
SIP Listen port	Enter the listening port number of the SIP server.
RTP port	Enter the SIP server's Real-time Transport Protocol port number here.

13.2.2.3 STUN

Some SIP service providers need you to setup STUN on your V660. STUN (Simple Traversal of UDP (User Datagram Protocol) through NATs (Network Address Translators) can solve some problems caused by NAT. Follow the instructions supplied by your VoIP service provider.

Figure 83 Settings: SIP Phone STUN Settings

SIP phone setting

STUN setting

☐ Enable

Server address:

Port:

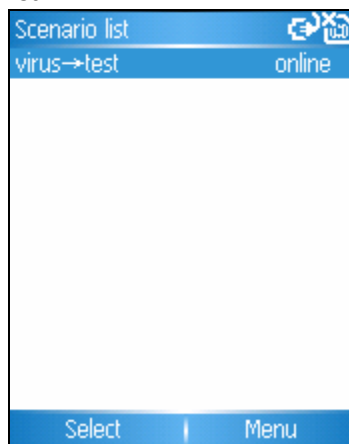
Done | Cancel

Select **Enable** and enter the details of the STUN server as supplied by your VoIP service provider.

13.2.3 Scenarios

To use Scenarios, you need to configure the V660's Wireless LAN settings and set up the SIP phone first. This feature associates a WiFi profile with a SIP phone, so that when your V660 enters the relevant wireless LAN's coverage area it automatically triggers the associated SIP profile to register.

Figure 84 Settings: Scenario List



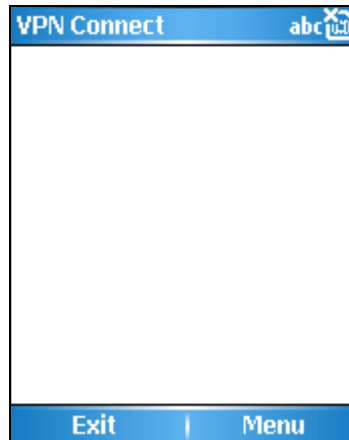
13.3 VPN

A VPN connection helps you to securely connect to a server, such as a corporate network, via the Internet. Ask your network administrator for your user name, password, domain name, TCP/IP settings, and the host name or IP address of the VPN server before you begin.

13.3.1 Create a VPN Connection

Every network connection is different. You should gather all of the relevant information or network settings you need before starting this process.

In the Home screen, click **Start > Settings > VPN**



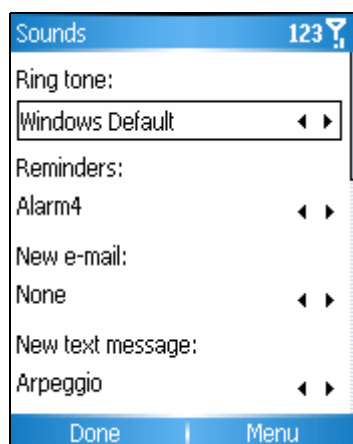
From this screen, take the following steps to set up a new VPN connection.

- 1** Click **Menu** > **New**.
- 2** In **Description**, enter a name for the connection.
- 3** In **VPN type**, select the type of VPN (only **IPSec/L2TP** is supported at the time of writing).
- 4** In **Server**, enter the VPN server name.
- 5** In **Connects from**, select the type of network from which you will connect to the VPN (**Internet** is the only supported network type at the time of writing).
- 6** In **Connects to**, select the type of network to which you will connect (**Work** is the only supported network type at the time of writing).
- 7** In **User name**, enter your user name for the VPN.
- 8** In **Password**, enter the password associated with the above **User name**.
- 9** In **Domain**, enter the VPN domain name if required.
- 10** Select the type of user authentication: **Pre-Shared Key** or **Certificate**.
- 11** If you selected **Pre-Shared Key** in **IPSec authentication**, enter the key in **IPSec Pre-shared key**.
- 12** Click **Done**.

13.4 Sounds

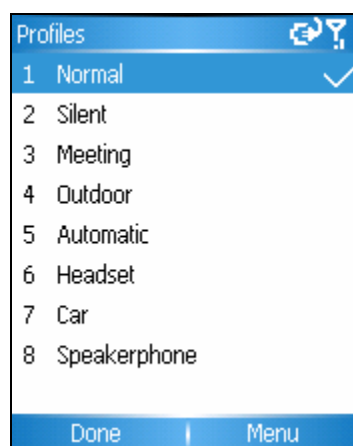
Select **Sounds** in the **Settings** screen to enter the V660's audio settings screen. Here, you can configure how the V660 behaves when you have new messages, incoming calls, or reminders.

Highlight the field you want to change and use the navigator to scroll through the settings. When you scroll to a new sound, it plays automatically.

Figure 85 Settings: Sounds

13.5 Profiles

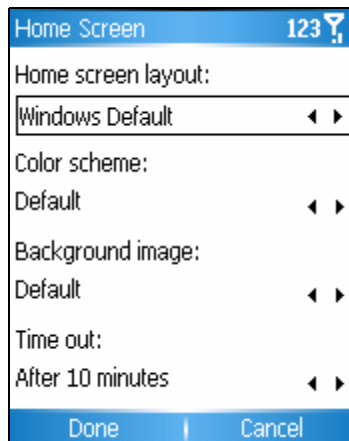
You can set up different sound schemes to use under different circumstances. Select **Profiles** in the **Settings** screen.

Figure 86 Settings: Profiles

You can rapidly switch between profiles from the **Quick List** screen. Access the **Quick List** screen by pressing the **Up** key on the side of the V660 for two seconds or more.

13.6 Home Screen

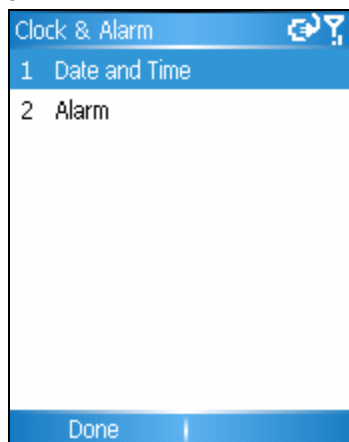
Use this screen to configure the layout, color scheme and background picture of the main screen, as well as the length of inactivity after which it automatically goes into power saving mode. Select **Home Screen** in the **Settings** screen.

Figure 87 Settings: Home Screen

Pictures to be set as wallpaper must be in GIF, JPG or BMP format.

13.7 Clock & Alarm

You can adjust the V660's clock and alarm settings. Select **Clock & Alarm** in the **Settings** screen. The following screen displays.

Figure 88 Settings: Clock & Alarm

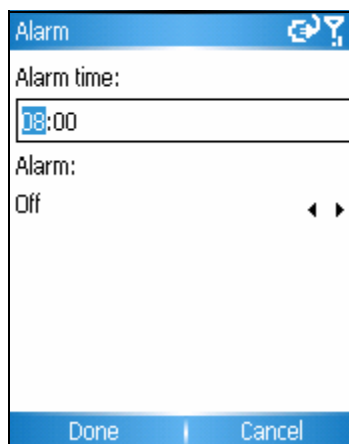
13.7.1 Date & Time

Here you can configure the V660 for the part of the world you are in, and set the date and time. Select **Settings > Clock & Alarm > Date & Time**.

Figure 89 Settings: Date and Time

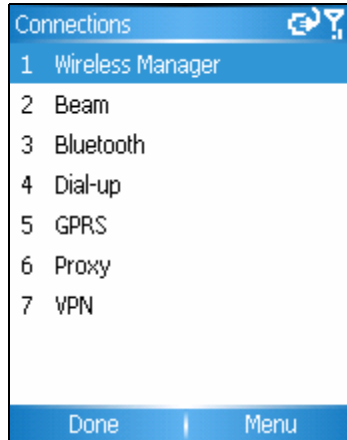
13.7.2 Alarm

Use this screen to set the V660's alarm (configure the **Date and Time** screen first). Select **Settings > Clock & Alarm > Alarm**. Set the alarm then activate it. You will be reminded when time runs out. Use the **Settings > Sounds** screen to check the sound assigned to the alarm.

Figure 90 Settings: Alarm

13.8 Connections

Here you can configure your V660's connection to other devices. See the following sections for instructions on how to configure each of the device types in this screen. Select **Connections** from the **Settings** screen. The following screen displays.

Figure 91 Settings: Connections

13.8.1 Wireless Manager

Wireless Manager allows you to manage and view the status of GPRS/UMTS or Wireless LAN connections. You can turn the WiFi connection and/or the cellphone connection off to make optimal use of the battery, view a variety of data related to the current configuration and signal quality, and increase network security.



To activate a second generation network like GPRS on your device and communicate with other devices on the network, you need to have a SIM or USIM card installed on your device.

Select **Wireless Manager** from the **Connections** screen. The following screen displays.

Figure 92 Settings: Wireless Manager

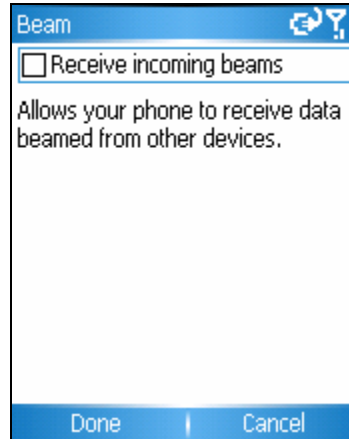
- Highlight an interface (such as **WiFi**, **Phone** or **All**) and click the navigator to turn that interface on or off.
- Select **Menu > WiFi Settings** to see details of your current WLAN connection, or configure a new connection.

- Select **Menu > Phone Settings** to go to the **Settings > Phone** screen (see [Section 13.1 on page 97](#)).

13.8.2 Beam

You can send and receive data to and from other infrared storage devices via infrared interface on this phone. Select **Beam** from the **Connections** screen. The following screen displays. This screen allows you to accept or deny beams from other infrared devices.

Figure 93 Settings: Beam



13.8.3 Network Connection Settings

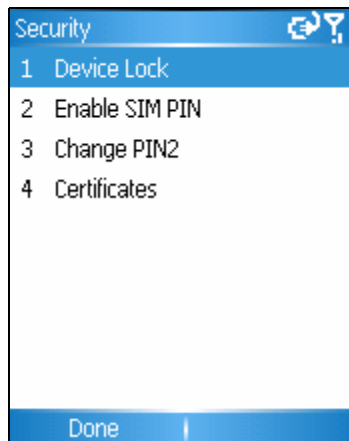
The V660 provides various means of connecting to the Internet, including via Dial-up, GPRS, Proxy, VPN, etc. If necessary, you can add connection schemes for each connection type, or modify existing ones.



If you changed settings and can no longer connect to the Internet, you can restore the V660 to its factory defaults by selecting **Start > Settings > More... > More... > Master Clear**.

13.9 Security

Use the **Security** screens to lock the V660, turn the SIM passcode on or off, and manage certificates.

Figure 94 Settings: Security

13.9.1 Device Lock

When you activate this feature, the V660 automatically locks after being idle for the amount of time you set. A password is the required to use the V660.



If you forget the password, there is no way for you to use the V660. Contact your vendor.

13.9.2 Using SIM PIN

Use this feature to protect your SIM card from being used by others without your permission. When this feature is enabled, the V660 requires you to enter the PIN each time you turn it on.



If you enter the PIN incorrectly three times in succession, the SIM card is locked. You cannot use the PIN to unlock it. Use the PUK to unlock the SIM card in this event.

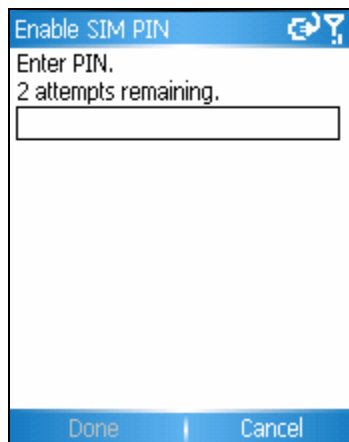


If you enter the PUK incorrectly seven times in succession, the SIM card is locked permanently.

Your PIN and PUK should be supplied along with your SIM card. If not, contact your service provider.

Select **Enable SIM PIN** from the **Security** screen. The following screen displays.

Figure 95 Settings: Enable SIM PIN



13.9.3 Changing PIN2

The PIN2 code protects some settings related to your cellphone service provider, such as fixed dialing and call barring. You can set PIN2 as a 4-8 digit number.

A PUK2 code is required when you intend to change a locked PIN2. Generally, the PUK2 code is not provided with the SIM card.



If you enter an incorrect PUK2 code ten times you will be permanently unable to change settings that are protected by PIN2.

Select **Change PIN2** from the **Security** screen. The following screen displays.

Figure 96 Settings: Change PIN2

13.9.4 Certificates



The factory default certificates on your V660 are necessary for its operation. If you delete them you must restore the V660 to its factory defaults by selecting **Start > Settings > More... > More... > Master Clear**.

Select **Certificates** from the **Security** screen. You can view, import and delete certificates in this screen. The following screen appears.

Figure 97 Settings: Certificates

- Select **Cert Import** to save a certificate from your computer.
- Select **Personal** to view and manage your imported certificates.
- Select **Root** to view and manage certificates the V660 uses to authenticate other certificates.

13.10 Removing Programs

Use this screen to delete programs no longer in use. This helps to free up the V660's memory.



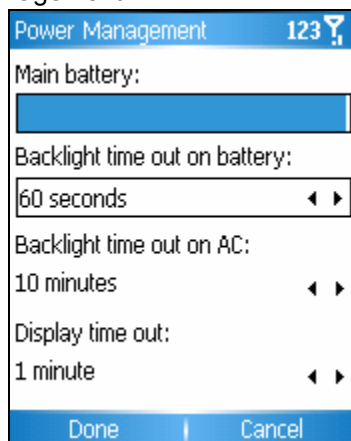
If you remove a program, it cannot be retrieved. You must re-install it if you want to use it again.

Select **Start > Settings > More... > Remove Programs**. In the program list, highlight the program you want to remove. Select **Menu > Delete** to delete it from the V660.

13.11 Power Management

Use this screen to check the V660's battery level and set the length of time after which the LCD light and display turn off.

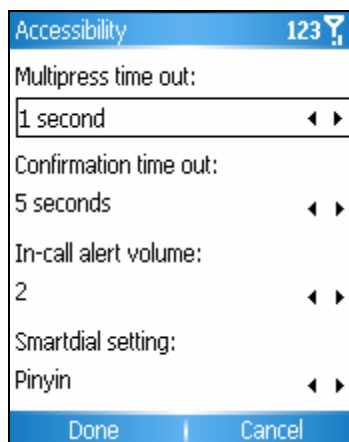
Figure 98 Settings: Power Management



13.12 Accessibility

Use this screen to control keypad, volume and language settings.

With this function, you can set system response time of multi-press, reminder volume, and smart dial setting.



When you press and hold down one of the alphanumeric keys, it cycles through the characters it represents. **Multipress time out** refers to the time the V660 waits before cycling to the next character.

Confirmation time out means the time after which an unconfirmed action is canceled.

In-call alert volume means the loudness of the alert when something happens during a call, such as receiving a text message.

Smartdial is how you access phone numbers of contacts quickly. For example, if you enter the digit “4” in the Home screen the V660 displays all phone numbers in your **Contacts** list containing a “4”, “g”, “h” or “i”. If you enter the digits “48”, the V660 displays phone numbers from the Contacts list that contain a “4”, “g”, “h” or “i” AND a “8”, “t”, “u” or “v”.

13.13 Regional Settings

Use this screen to change the language your V660’s display uses, date, time, numerical and currency formats.

After changing the language or the other settings in this screen, turn the phone off and on again in order to make the changes take effect.

Select **Regional Settings** in the **Settings** screen. The following screen displays.

Figure 99 Settings: Regional Settings

13.14 Owner Information

You can add your name, phone number and e-mail address here. Select **Owner Information** in the **Settings** screen.

13.15 About

Use this screen to view hardware and software information of your phone. This screen is read-only. Select **About** in the **Settings** screen.

13.16 Error Reporting

Use this screen to turn Error reporting on or off. When error reporting is on, system errors cause error reports to be sent to Microsoft. Select **Error Reporting** in the **Settings** screen.

13.17 Master Reset

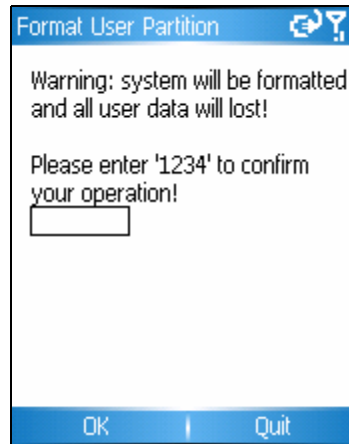
Use this screen to return all the V660's settings to their factory defaults.



The Master Reset deletes all information from your V660. Ensure you have taken note of any information you want to keep before you do this.

Select **Master Reset** in the **Settings** screen. The following screen appears.

Figure 100 Settings: Master Reset



Enter the confirmation code “1234” in the field and press **OK**.

PART III

Voice, Video and Camera

Voice Notes (125)

Pictures and Videos (127)

Camera (131)

Voice Notes

You can use the V660 to record audio. It uses the internal microphone to record, and the internal speaker for playback unless you have a headset connected via the USB port. When a headset is connected, the V660 uses the headset's microphone and earpiece for recording and playback.

14.1 Recording a Voice Note

To access the Voice Note feature, either select **Start > More > Voice Notes**, or alternatively press and hold the **Down** key on the side of the V660 for a couple of seconds. The **Voice Notes** screen displays.

Press **Record** to start a new recording. Press **Stop** to end the recording and return to the **Voice Notes** screen.



14.2 Playing a Voice Note

In the Voice Notes screen, highlight an audio file and select it (click the navigator) or select **Menu > Play** to begin playback of the file. Press **Stop** to end playback.

14.2.1 Set as Ringtone

You can set the V660 to use a voice note file as the ringtone. When someone calls you, the voice note plays. Highlight a voice note and select **Menu > Set As Ringtone**.

When you have done this, you can go to **Start > Settings > Sounds** to check your settings. You can select the voice note to play under other circumstances as well, for example when you receive a text message, or as the alarm sound.

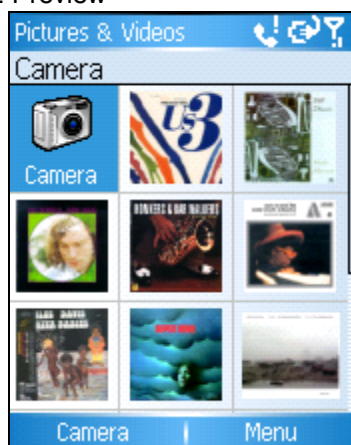
Pictures and Videos

You can store and view pictures on the V660, and on the memory card. You can set a picture as the background for the **Home** screen (the “wallpaper”) or send it to others.

15.1 Pictures and Videos Preview

Select **Start > More > Pictures and Videos**. The LCD screen displays thumbnails (previews) of all pictures stored on your phone and on the memory card.

Figure 101 Pictures & Videos: Preview



Use the navigator to move around the **Preview** screen. Press **View** to see the highlighted picture enlarged.

In the **Preview** screen, press **Menu**. The following table describes the **Menu** operations.

Table 16 Pictures & Videos: Menu

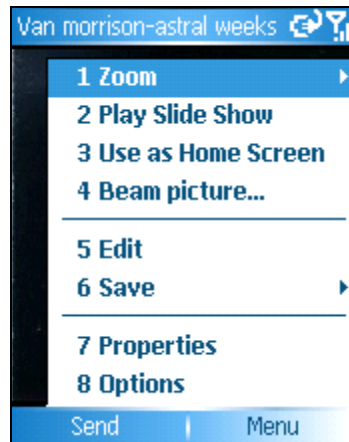
LABEL	DESCRIPTION
Send	Send the highlighted picture to someone else via e-mail or MMS.
Beam	Send the highlighted picture to someone else via the infrared interface.
Save to Contact	Associate the picture with a contact's record. Select this option, and choose the contact from the list. When you do this, the picture appears next to the contact's name in the record. Also, the picture displays when you contact calls you, or you call the contact.
Delete	Delete the highlighted picture from the V660 or the memory card. If you do this the picture cannot be retrieved.
Edit	Cut or copy the highlighted picture.

Table 16 Pictures & Videos: Menu

LABEL	DESCRIPTION
Play Slide Show	View all the pictures one after the other. The pictures cycle automatically. Use the navigator to manually cycle through the pictures.
Folders	View pictures stored in other folders on the V660.
Options	Change how your V660 displays pictures on-screen and in e-mails you send.

15.2 Viewing a Picture

To view a picture, highlight it in the **Preview** screen and either click the navigator or press **View**.

Figure 102 Pictures & Videos: View Menu

The following table describes the labels in this screen.

Table 17 Pictures & Videos: View Menu

LABEL	DESCRIPTION
Send	Send the highlighted picture to someone else via e-mail or MMS.
Zoom	These settings do not change the picture file itself, just the way it displays on the screen. Select Zoom In to enlarge the picture's display size. Select Zoom Out to reduce the picture's display size. Select Fit to Screen to stretch or squeeze the picture so that it occupies the entire LCD screen. Select Actual Size to see the picture at its real size.
Play Slide Show	View all the pictures one after the other. The pictures cycle automatically. Use the navigator to manually cycle through the pictures.
Use as Home Screen	Select this to use the picture as the background ("wallpaper") for the V660's main screen.
Beam Picture...	Send the highlighted picture to someone else via the infrared interface.

Table 17 Pictures & Videos: View Menu

LABEL	DESCRIPTION
Edit	<p>Select this to go to the picture editor.</p> <p>In the editor, press Menu to access the editing tools.</p> <p>Select Rotate to turn the picture 90 degrees clockwise.</p> <p>Select Crop to draw a new picture boundary. Position the top left corner of the new boundary (move about the screen using the navigator and click the navigator to select the corner point). Then, select the bottom right corner in the same way.</p> <p>Select Auto Correct to have the V660 automatically fix the picture's brightness and contrast.</p>
Save	<p>Select Save to Contact... to associate the picture with a contact's record.</p> <p>Select Save As... to save the picture under a different filename.</p>
Properties	<p>Select this to see details about the picture.</p>
Options	<p>Change how your V660 displays pictures on-screen and in e-mails you send.</p>

Camera

Your V660 has an inbuilt digital camera. You can use the camera to take still pictures and record video (with or without sound). To use the camera, select **Start** > **More** > **Camera**, or press the **Camera** button on the side of the V660.

16.1 Camera Use

Bear the following in mind when using the V660's camera.

- Dirt or grease on the clear protective housing over the camera lens can obscure the picture. Clean the housing with lens tissue or a soft cloth.



Do NOT use abrasives or solvents to clean the clear protective housing over the lens, as this could damage the housing and reduce picture quality.

- The amount of light entering the lens affects picture quality. Too little light results in a dark, unclear picture. Too much light results in an overly bright picture. Your V660's camera automatically adjusts to a bright or dark environment, but cannot provide equivalent picture quality to a shot taken under optimum light conditions.



Never point the camera directly at the sun. This could damage the camera permanently.

- Movement of the camera while shooting can blur the picture, particularly under low light conditions (when the camera's lens stays open for longer).



Do not expose the camera to sunlight or extremes of temperature for extended periods. This could damage the camera permanently.

16.2 Shooting Pictures and Video

When you access the V660's camera function, the **Viewfinder** screen displays.

In the **Viewfinder** screen:

- Press **Capture** to take the shot (if the V660 is in **Photo** mode) or start recording video (if the V660 is in **Video** mode). In **Video** mode, press **Stop Capture** to stop recording. You can also click the navigator to use the same functions.
- Press the navigator up or down to zoom in or out.
- Press **Menu** to view or change camera settings.



The available memory of your V660 or memory card determines the maximum number and size of photos, and the maximum number and length of videos you can store.

16.3 Camera Menu

Press **Menu** in the **Viewfinder** screen.

The following table describes the labels in this menu.

Table 18 Camera Menu

LABEL	DESCRIPTION
Mode	Use these options to select the current camera mode. Select Photo to take single, still pictures. Select Video to record moving images. Select Portrait to take a still picture and assign it to a contact's record. Select Self Shutter to have the V660 count down before taking a still picture. Select Burst to have the V660 take a series of still pictures in rapid succession.
Zoom	Select the magnification level you want to use. This affects the pictures you take, not just the way they display.
Environment	The V660's camera has a variety of presets that help take better pictures under certain conditions. Select Sunny , Cloudy , Office , Home or Night according to your conditions. Alternatively, select Auto . Select Monochrome (greyscale), Ancient (sepia) or ColdColor (blue tint) to use a preset photo effect. Select Advanced to manually configure the brightness, contrast, hue, saturation and gamma levels of the shots you take.

Table 18 Camera Menu

LABEL	DESCRIPTION
Setting	<p>Use these options to view and make changes to the camera's configuration.</p> <ul style="list-style-type: none"> • Select General to change where photos and videos are stored (if you have a memory card installed), the spark frequency (viewfinder screen refresh rate), and whether or not the V660 displays a shot immediately after you take it. • When you take a photograph, the V660 saves it as a JPEG (Joint Photographic Experts Group) file. Select Photo to change the quality of the JPEG image. • Select Video to turn audio capture on or off. When audio capture is off and you record a video, the V660 does not record a soundtrack. • Select Mode to see and modify the following. <ul style="list-style-type: none"> In Photo or Portrait mode: format and resolution. In Video mode: format, resolution and time limit. In Self Shutter mode: format, resolution and timer counter. In Burst mode: format, resolution and burst number
Album	Select this to go to the folder where the photos and videos you take are automatically stored.
About	Select this to see details of your V660's camera version.
Exit	Select this to return to the Home screen.

PART IV

Games, Tools and Troubleshooting

Games (137)

Accessories (141)

File Explorer (143)

Java (145)

SIM Manager (147)

Firmware Upgrade (149)

Troubleshooting (151)

Games

This chapter outlines the V660's pre-installed games.

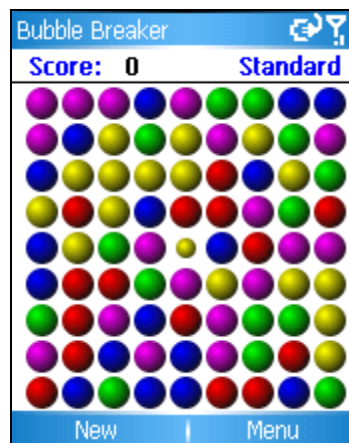
17.1 Bubble Breaker

Bubble Breaker is easy to learn, yet difficult to master. The objective is to align similar bubbles to form large blocks of bubbles before bursting them. The more bubbles you have in the block before they are burst, the greater number of points you receive.

17.1.1 Start Bubble Breaker

To start Bubble Breaker, click **Start > Games > Bubble Breaker**.

Figure 103 Bubble Breaker



To burst a bubble, the bubble must be connected to other similar bubbles on the playing board. If you select a bubble that is connected, those connected bubbles will be highlighted and a new bubble will pop up, displaying that block's potential bubble points. Click your selection again to burst the bubbles.

17.1.2 Breaker Bonus

If you manage to leave fewer than five bubbles on the board, you will be rewarded with more points at the conclusion of the game.

17.1.3 Undo

Moves in Bubble Breaker can be undone. To take back the last move you made, Select **Menu** > **Undo Move**.

17.1.4 Set Bubble Breaker options

Bubble Breaker allows you to vary your playing experience.

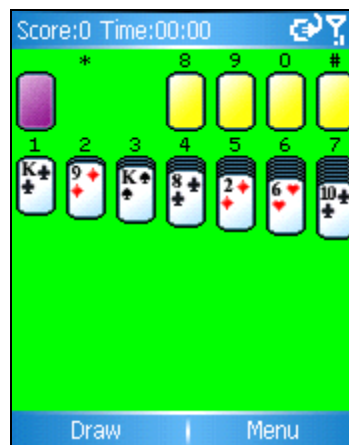
- Click **Menu** > **Options**, and select options from the following:
- **Play Sounds**. Turns on or off the game sounds.
- **Guest Mode**. Enables guests to play without affecting the statistics.

17.2 Solitaire

To open Solitaire, on the Home screen, click **Start** > **Games** > **Solitaire**.

To deal the cards, click **Menu** > **New Game**.

Figure 104 Solitaire



17.2.1 Moving Cards

A number or character is displayed above each card stack.

On the keypad, press the number or character above the card you want to move, and then press the number or character above the stack to which you want to move the card.

To move a card up to one of the four stacks in the right-hand corner of the screen, press the number above the card in the lower stack, and then press the navigator up.

To undo a move, click **Menu** > **Undo**.

Build the suit stacks at the top in ascending order, from Ace to King.

You win the game when all cards are in the suit stacks.

17.2.2 Playing Solitaire

Move any aces on the seven stacks to the four card spaces at the top of the screen, and then make any other available plays.

When you have made all available plays, click **Draw** to turn over cards.



The top card that is face up on the deck is always available for play.

Accessories

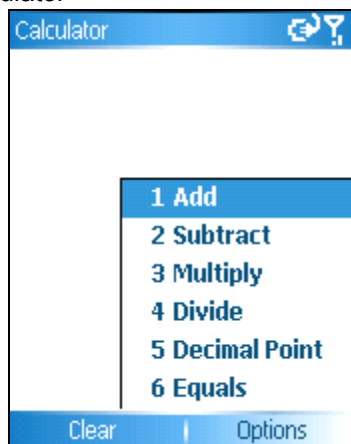
18.1 Calculator

Use the **Calculator** to do simple arithmetic, including additions, subtractions, multiplications, divisions, and centesimal calculations.

To access the **Calculator**, select **Start > More > Accessories > Calculator**.

In the **Calculator** screen, input digits with keypad. Press the # key to cycle through operators, or use the navigator. Press the * key to enter a decimal point. Input a second number, and then click the navigator to get the result. Press **Clear** to clear the screen.

Figure 105 Accessories: Calculator



18.2 Download Agent

Use the **Download Agent** to check the transfer status of files being downloaded from the network. Select **Start > More > Accessories > Download Agent**.

18.3 Task Manager

Use the **Task Manager** to manage applications running on your V660. Select **Start > More > Accessories > Task Manager**.



If you close an application any unsaved information will be lost!

Highlight an application and press **Close** to stop the application.

Select **Menu > Go to** to jump to the highlighted application.

Select **Menu > Refresh** to update the list.

Select **Menu > Stop** to close the highlighted application.

Select **Menu > Stop All** to close all applications.

Select **Menu > System Info** to see information about the amount of memory in use, and the main battery power level (if the V660 is using mains or USB power, **AC** displays).

Select **Menu > About** to see information about the Task Manager.

Select **Menu > Exit** to return to the previous screen.

File Explorer

The File Explorer allows you to see and manage all the files on the V660.



If you delete or modify system or program files, the V660 may not work properly. If this happens you may need to perform a master reset (see [Section 13.17 on page 121](#)).

Select **Start** > **More** > **File Explorer**.

In the **File Explorer** screens, press Up to move up one level in the file structure. Press **Menu** to view and manage files.

The following table describes the **File Explorer** menu.

Table 19 File Explorer: Menu

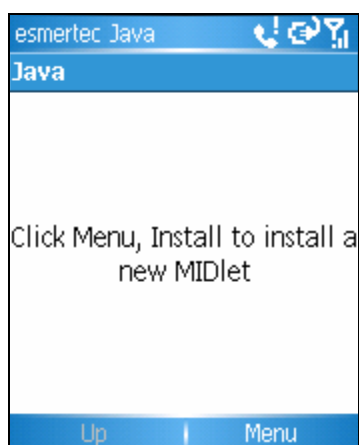
LABEL	DESCRIPTION
Send	Select this to send files to other people as part of a text message, an email, or an MMS. Not all file types can be sent with all message types.
Beam...	Select this to send files to another compatible device via the infrared interface.
Edit	Select this to cut, copy, paste, delete or rename a file, or to create a new folder in the current location.
Properties	Use this to see details of the currently highlighted file or folder.
View	Select this to change the way you view the contents of folders.
Sort By	Select this to change the way the V660 arranges the files and folders in the File Explorer.
My Device	Select this to go to the V660's root directory.
My Documents	Select this to go to the folder where pictures, sounds and voice notes are automatically stored.

The V660 supports Java applications.

20.1 The Java Screen

Select **Start > More > Java**. The **Java** screen displays, showing all Java applications installed on your V660. Highlight an application and click the navigator to open the program.

Figure 106 Java



20.2 Installing Java Applications

By default, no Java application has been pre-installed on your phone. Install new Java MIDlets by downloading install applications (with file extensions as **.jar**, or **.jad**) from the Internet. Follow the on-screen directions to install the application.

SIM Manager

When you have a SIM card installed in the V660, you can use this function to see details about the card and manage your list of contacts.

21.1 Using the SIM Manager

Select **Start > More > More > SIM Manager**.

- Select **Copy all SIM to Contacts** to create duplicate entries of your SIM card entries in the V660's **Contacts** list. Your SIM card entries are not deleted.
- Select **Copy Selected SIM to Contacts** to create duplicate entries of certain SIM card entries in the V660's **Contacts** list. Your SIM card entries are not deleted.
In the screen that appears, select the contacts you want to duplicate and click **OK**.
- Select **Copy all Contacts to SIM** to create duplicate entries of your V660's **Contacts** list entries on your SIM card. Your **Contacts** list entries are not deleted.
- Select **Copy Selected Contacts to SIM** to create duplicate entries of certain V660 **Contacts** list entries on your SIM card. Your **Contacts** list entries are not deleted.
In the screen that appears, select the contacts you want to duplicate and click **OK**.



Generally, SIM card entries can contain only a name and a single phone number. When you copy contact records containing more than one phone number from the V660, only the default phone number is copied to the SIM card.

In the **SIM Card Capacity** section, **Total** refers to the number of (occupied and unoccupied) contact list slots on the installed SIM card, and **Used** refers to the number of occupied slots.

Firmware Upgrade

This chapter describes how to upgrade the V660's firmware using a T-Flash (microSD card). Find firmware at www.zyxel.com

Make sure you have downloaded (and unzipped) the correct model firmware and version to your computer before uploading to the device.



Be sure to upload the correct model firmware as uploading the wrong model firmware may damage your device.

Take the following steps to upload firmware to the V660.

- 1 Ensure that the file system on your microSD card is FAT16.
- 2 Copy the MUPDAT.DIP file to the root directory of the microSD card.
- 3 Turn the V660 off.
- 4 Insert the microSD card into the V660's microSD port.
- 5 Press the **Power** key and the **6** key simultaneously. The V660 gets the files from the microSD card.
- 6 A bar displays. This shows the upload progress status. When the upload is complete, the V660 restarts automatically.

Troubleshooting

This chapter offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories.

- [Power, Hardware and LEDs](#)
- [V660 Access and Login](#)
- [Cellphone Calls and Messaging](#)
- [Wireless LAN, VoIP Calls and Internet Access](#)

23.1 Power, Hardware and LEDs



I cannot turn the V660 on.

- If you are using the USB cable or the mains adaptor, check the **Operation** LED (the red light in the top right-hand corner of the V660). If it is not on, see the troubleshooting section entitled “[The Operation LED does not come on when I try to charge the V660.](#)”. If you are using battery power only (you do not have any cables connected to the V660):
- The contacts (the metal parts) on the battery or the V660 may be dirty or corroded. Clean them.



Do not use liquid of any kind to clean the battery or the V660.

- The battery may be nearly or completely discharged (flat). Charge the battery using the included charger or USB cable. If you have another battery with exactly the same specifications, try using it instead.

If none of these things help, the battery may be faulty, or your V660 may have a hardware problem. Contact your vendor.



The V660 keeps shutting itself down.

It is likely that the battery is nearly discharged (flat). This may be the case even if you are using the USB cable or the included charger. Recharge the V660's battery, or replace it if you have a spare with exactly the same specifications.

If this does not help, see the troubleshooting section entitled "[I cannot turn the V660 on.](#)".



The **Operation** LED does not come on when I try to charge the V660.

The V660 is not receiving power. check the V660's connection to the power supply (the mains socket if using the charger or the computer if using the USB cable) and try to turn the V660 on again. If this does not help, take the following steps.

- If you are using the USB cable:
The battery may be nearly or completely discharged (flat). The V660 will turn on only when it has sufficient charge in its battery. Keep the USB cable connected and wait a short time while the battery charges, or switch to the mains charger.
- If you are using mains power:
Ensure that the mains power supply is switched on and flowing. Check the mains charger's LED, if it has one. It should be on when the power supply is on, whether or not the V660 is connected.
- If you have another mains charger with exactly the same specifications, try using it instead.

If none of these things help, the mains charger or the V660 may have a hardware problem. Contact your vendor.



I cannot use the keypad.

Your V660's keypad may be locked. Press the left softkey then the * key to unlock it.

If you are asked for a password, see the troubleshooting section entitled "[I am asked for a 'device password'.](#)" on page 153.



I cannot hear anything from the earpiece.

Check that there is not a headset plugged into the USB port. The V660's inbuilt earpiece and microphone are automatically disabled when a headset is installed.

If there is no headset plugged in, the earpiece volume may be turned down. Press the Up key on the side of the V660 to increase the volume if necessary.

If this does not help, try connecting a headset or using the speakerphone and making a call (or doing anything else on the V660 that usually produces a noise). If you can hear the noise through the headset's earpiece or the speaker, there may be a hardware problem with the inbuilt earpiece.



The LCD screen keeps going blank.

Press any key.

- If the LCD screen lights up, the settings in the **Start > Settings > More > Power Management** are set to turn the screen off too quickly. See [Section 13.11 on page 119](#) for how to change the settings.
- If the LCD screen doesn't come back on, the V660 may be switching itself off due to a low battery charge. See the troubleshooting section entitled "[The V660 keeps shutting itself down.](#)" on page 151.



I cannot beam information to or from other infrared devices.

Check that there are no obstructions between the infrared interfaces of the two devices, and that the interfaces themselves are free of dirt.

- If you want the V660 to receive information from the other device, check that it is set to receive (**Receive incoming beams** should be selected in the **Start > Settings > Connections > Beam** screen).
- If you want the V660 to send information to the other device, the other device may need to be set to receive incoming beams. Methods of doing this vary according to the device.

23.2 V660 Access and Login



I am asked for a 'device password'.

The V660 has been locked using the device lock. When this is on, the V660 locks automatically if it is not used for a set time. Enter the password and press **Done**.

- If you know the password and want to turn the lock off or change its settings, see [Section 13.9.1 on page 116](#).
- If you do not know the device password, there is no way for you to access the V660. Contact your vendor.



I am asked for a 'PIN', 'PIN2', 'PUK' or 'PUK2'.

The SIM PIN or PIN2 function is on. The PIN is a code you must enter to access SIM card calling functions. The PIN2 is a different code used to protect certain specific SIM card functions. Enter the SIM PIN or PIN2 and press **Done**.

- If you know the SIM PIN or PIN2 and want to turn it off, see [Section 13.9.2 on page 116](#).
- If you know the SIM PIN, but it does not unlock the SIM card when you enter it, the SIM card may have become locked. This happens when the PIN is entered wrongly multiple times consecutively. You must enter the PUK (Personal Unblocking Key) to unlock the SIM card. Contact the cellphone service provider who supplied your SIM card if you do not know the PUK.



It is possible to lock the SIM card permanently. This happens if you enter the wrong PUK multiple times in succession. If the SIM card is permanently locked, you cannot access data stored on it.

If you do not know the SIM PIN, there is no way for you to use cellphone functions. Contact the cellphone service provider who supplied your SIM card.

23.3 Cellphone Calls and Messaging



I cannot make or receive cellphone calls, or send or receive SMS (text) messages.

- You may be in an area with poor or nonexistent reception. Check the cell signal indicator on the LCD screen. Moving outdoors, to a higher position or nearer to a cell mast's likely location can help improve poor reception.
- You need to have a SIM card installed in the V660 to make cellphone calls (see your Quick Start Guide). If you have installed a SIM card, it may be wrongly inserted or faulty. Check if the "missing SIM" or "faulty SIM" icon displays on the LCD screen. If so, turn the V660 off, remove the battery cover and the battery, and check the SIM card. If there is any dirt or corrosion on the contacts (the metal parts) of the SIM card or the V660, remove it carefully. Reinsert the SIM card and battery, and slide the battery cover back on. Turn the V660 on.



Do not use liquid of any kind to clean the V660.

- Your cellphone account may be deactivated or otherwise unusable. Contact your service provider.



I cannot send or receive MMS messages.

- Your cellphone service provider may not support MMS, or you may need to subscribe to the service. Contact the service provider to find out.
- You may have a signal or SIM card problem. See the troubleshooting section entitled “I cannot make or receive cellphone calls, or send or receive SMS (text) messages.” on page 154.



Cellphone service is poor or intermittent.

If you can make or receive cellphone calls, but the quality of voice signal is poor, it is likely that the cell signal reception is weak. Move outdoors, to a higher position, or nearer to a cell mast’s likely location. It is also possible that battery power is too low. Charge the V660’s battery.

If you could previously make cellphone calls but now cannot, all the cellphone network’s channels may be full. Wait a short time and try again.

23.4 Wireless LAN, VoIP Calls and Internet Access



When I scan for an access point I can’t find one, or I can’t find the right one.

If you scan for an access point (AP) and find none, either the V660 is out of the AP’s coverage area (out of range), or the AP is set to not broadcast its ESSID (the network name). Move closer to the AP and try again.

If the AP still does not show on the scan result, either:

- Input the ESSID manually and try to connect.
- Access the AP’s configuration interface and set it to broadcast the ESSID.

If other APs display when you scan, the V660 is working correctly. However, if you know that there are other APs in the area, and no APs display when you scan, you may have a hardware problem. In this case, contact your vendor.



I can't connect to the access point.

If you find the AP when you scan, but you cannot connect to it, there may be a problem with the wireless security settings.

- Ensure that the V660 supports the security standard the AP uses.
- Ensure that the V660 and the AP use exactly the same settings.
- If you continue to experience difficulties, set the AP to use no security (disconnect it from the network first) and try to connect.
- If you have another wireless client (a notebook wireless card, for example) try using it to connect. If it connects successfully, your V660 may have a hardware problem. Contact your vendor. If the other wireless client does not connect successfully, the AP may be malfunctioning or misconfigured.



I can't make VoIP calls.

- First, ensure you are entering the phone number correctly. Use a “#” before the phone number to have the V660 use the VoIP connection instead of your cellphone service. For example, to call the number “555123456” using the VoIP connection, dial “#555123456”.
- Check your wireless LAN signal (not the cellphone signal strength). Go to the Home screen and make sure a network name (ESSID) displays in the **Wifi:** field. If the V660 has no WiFi connection, you cannot make VoIP calls.
- Check that your SIP account is correctly configured and that the V660 has registered with a SIP server (see [Section 13.2.2 on page 106](#)).



I can make and receive VoIP calls, but the voice quality is poor or intermittent.

There are several possible causes for this.

- The Wireless LAN signal may be weak. Move closer to the access point, and away from potential sources of radio interference (such as microwave ovens, electric motors and other radio frequency emitting devices). If you have more than one access point, scan for and connect to the one with the stronger signal.
- Your V660 may be set to use a voice codec (audio coder / decoder) that does not provide optimal sound quality. See [Section 13.2.2.1 on page 106](#) and check with your VoIP service provider to find out the codecs you should use.

- Your VoIP service provider may be using settings that reduce voice quality in order to conserve bandwidth. You may need to subscribe to a different calling plan to get better call quality.
- The VoIP service's channels may all be full. Wait a short time and try again.
- If call quality is always poor when you call certain phone numbers, the other person's connection may be at fault.



I can't connect to the Internet.

If you cannot connect to the Internet at all, check your connection to the wireless access point (AP).

- If you are not connected to the AP, see the troubleshooting section entitled "[I can't connect to the access point.](#)" on page 156.
- If you are successfully connected to an AP but cannot access the Internet, check the settings on the AP and any computer or network device (such as a router) that it is connected to. Ensure that the AP has Internet access.



Pages from the Internet take a long time to download.

If you can connect to the Internet, but the download speed is slow, the wireless LAN signal may be weak. Move closer to the access point, and away from potential sources of radio interference (such as microwave ovens, electric motors and other radio frequency emitting devices). If you have more than one access point, scan for and connect to the one with the stronger signal.

Your V660 may be competing for bandwidth with other devices on the network. Either disconnect the other devices, or connect to the Internet at times when the network is less busy.

PART V

Appendices and Index

Product Specifications (161)

Wireless LANs (165)

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Customer Support (183)

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Product Specifications

The following tables summarize the V660's hardware and firmware features.

Table 20 Hardware Specifications

Dimensions (L x W x D)	108 x 45 x 16.7 mm
Weight	96 g
Power Specification	5.6 V, 0.8 A
Ports	USB (10-pin I/O connector) T-Flash Port
Camera	1.3 megapixel CMOS
Antenna	Quad-band GSM internal antenna 2.4GHz WLAN internal antenna
LCD Screen	1.9-inch QCIF 176 x 220 resolution 64,000 colors
Infra-red Connection	IrDA (infra-red Data Association) 1.2 SIR (115kbps at 30cm)
Operating Temperature	-10 ~ 60 C
Storage Temperature	- 40 ~ 80 C
Operating Humidity	10 ~ 90 %
Storage Humidity	5 ~ 95 %
Memory	Flash: 64MB RAM: 64MB
RADIO SPECIFICATIONS	
Communications Standards	IEEE 802.11b IEEE 802.11g ETSI GSM 05.05 ETSI GSM 11.10 3GPP 51.010
Frequency	IEEE 802.11b/g: Industrial Scientific Medical Band 2.4 ~ 2.4835 GHz GSM850 / GSM900 / DCS1800 / PCS1900
IEEE 802.1b/g Operating Channels	North American and Taiwan: 11 Europe: 13
IEEE 802.1b/g Data Rate	IEEE 802.11b: 11Mbps with automatic fallback to 5.5, 2, 1 Mbps IEEE 802.11g: 54Mbps with automatic fallback to 48, 36, 24, 18, 12, 9, 6 Mbps

Table 20 Hardware Specifications

Modulation	IEEE 802.11b: CCK (11 and 5.5 Mbps), DQPSK (2 Mbps) and DBPSK (1 Mbps) IEEE 802.11g: OFDM with BPSK, QPSK and 16/64-QAM sub-Carrier modulations
Average Output Power	Tolerance: +/- 1.5 dBm IEEE 802.11b: 18 dBm at 11 Mbps IEEE 802.11g: 15 dBm at 54 Mbps
RX Sensitivity	Tolerance: +/- 1 dBm IEEE 802.11b: -84 dBm at 11 Mbps IEEE 802.11g: -72 dBm at 54 Mbps

Table 21 Firmware Specifications

FEATURE	DESCRIPTION
Operating System	Microsoft Windows Mobile 5.0
Device Management	Use Microsoft ActiveSync to manage the V660 from a connected PC and upload / download files.
Wireless Functionality	Connect wirelessly to IEEE 802.11b and/or IEEE 802.11g wireless access points for Internet access and VoIP calls. Enable wireless security (WEP, WPA(2), WPA(2)-PSK or IEEE 802.1x).
Cellphone Functionality	Install a SIM (Subscriber Identity Module) card and connect to your service provider's GSM and GPRS networks.
Firmware Upgrade	Download new firmware (when available) from the ZyXEL web site. Upload the firmware using the USB cable, or a T-flash card. Note: Only upload firmware for your specific model!
Microsoft Internet Explorer	Use this to browse the Internet on your V660.
Windows Media Player	Use this to play music and video on your V660.
Java	Install and use Java applications.
Messaging	The V660 supports sending and receiving SMS (Short Message Service), MMS (Multimedia Messaging Service) and E-mail.
Voice Notes	Record and play back audio files.
File Explorer	Use this to browse the V660's internal file system.
Pocket MSN	Use this to quickly access your Microsoft Network account features, such as Hotmail and MSN Messenger.
SIM Manager	Use this to see details of your SIM (Subscriber Identity Module) card and manage your list of contacts.
Speed Dial	Use this to quickly call frequently-used or emergency phone numbers.
Dynamic Jitter Buffer	The built-in adaptive buffer helps to smooth out the variations in delay (jitter) for voice traffic. This helps ensure good voice quality for your conversations.
Voice Activity Detection/ Silence Suppression	Voice Activity Detection (VAD) reduces the bandwidth that a call uses by not transmitting when you are not speaking.
Comfort Noise Generation	Your device generates background noise to fill moments of silence when the other device in a call stops transmitting because the other party is not speaking (as total silence could easily be mistaken for a lost connection).

Table 21 Firmware Specifications

FEATURE	DESCRIPTION
Echo Cancellation	You device supports G.168, an ITU-T standard for eliminating the echo caused by the sound of your voice reverberating in the telephone receiver while you talk.
QoS (Quality of Service)	Quality of Service (QoS) mechanisms help to provide better service on a per-flow basis. Your device supports Type of Service (ToS) tagging. This allows the device to tag voice frames so they can be prioritized over the network.
Voice Codecs	G.711a/u, G.723.1A, G.726 (16/24/32/40), G.729a/b
DTMF	In-band and out-of band PCM, RFC2833, SIP Info
Ring File Management	Upload and download MIDI (.mid) ringtone files to and from the V660.

The following list, which is not exhaustive, illustrates the standards supported in the V660.

Table 22 Standards Supported

STANDARD	DESCRIPTION
RFC 1112	IGMP v1
RFC 1157	SNMPv1: Simple Network Management Protocol version 1
RFC 1321	The MD5 Message-Digest Algorithm
RFC 1441	SNMPv2 Simple Network Management Protocol version 2
RFC 1631	IP Network Address Translator (NAT)
RFC 1661	The Point-to-Point Protocol (PPP)
RFC 1723	RIP-2 (Routing Information Protocol)
RFC 1890	RTP Profile for Audio and Video Conferences with Minimal Control
RFC 1901	SNMPv2c Simple Network Management Protocol version 2c
RFC 2236	Internet Group Management Protocol, Version 2.
RFC 2327	SDP: Session Description Protocol.
RFC 2408	Internet Security Association and Key Management Protocol (ISAKMP)
RFC 2516	A Method for Transmitting PPP Over Ethernet (PPPoE)
RFC 2617	HTTP Authentication: Basic and Digest Access Authentication
RFC 2766	Network Address Translation - Protocol
RFC 2833	RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals
RFC 3261	SIP: Session Initiation Protocol. (Updated by RFC3265, RFC3853)
RFC 3264	An Offer/Answer Model with Session Description Protocol (SDP)
RFC 3515	The Session Initiation Protocol (SIP) Refer Method.
RFC 3550	RTP: A Transport Protocol for Real-Time Applications.
RFC 3665	Session Initiation Protocol (SIP) Basic Call Flow Examples
RFC 3891	The Session Initiation Protocol (SIP) "Replaces" Header
RFC 3892	The Session Initiation Protocol (SIP) Referred-By Mechanism. R.
RFC 4028	Session Timers in the Session Initiation Protocol (SIP)
ITU Q.23	Dual-Tone Multi-Frequency signaling (DTMF)

Table 22 Standards Supported (continued)

STANDARD	DESCRIPTION
Microsoft PPTP	MS PPTP (Microsoft's implementation of Point to Point Tunneling Protocol)
1.363.5	Compliant AAL5 SAR (Segmentation And Re-assembly)
IEEE 802.11	Also known by the brand Wi-Fi, denotes a set of Wireless LAN/WLAN standards developed by working group 11 of the IEEE LAN/MAN Standards Committee (IEEE 802).
IEEE 802.11b	Uses the 2.4 gigahertz (GHz) band
IEEE 802.11g	Uses the 2.4 gigahertz (GHz) band
IEEE 802.11d	Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges
IEEE 802.11x	Port Based Network Access Control.

Wireless LANs

Wireless LAN Topologies

This section discusses ad-hoc and infrastructure wireless LAN topologies.

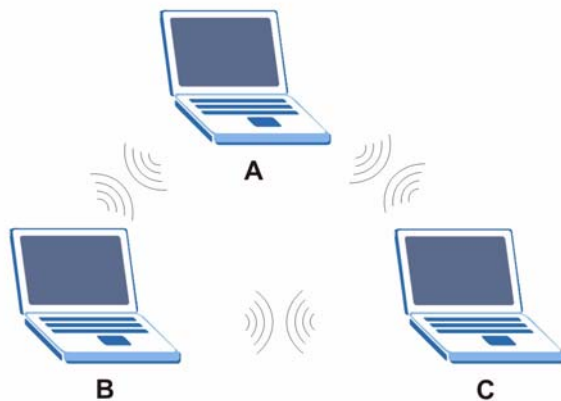


This appendix is a general discussion of wireless LANs. Not all features discussed may be available on the V660.

Ad-hoc Wireless LAN Configuration

The simplest WLAN configuration is an independent (Ad-hoc) WLAN that connects a set of computers with wireless adapters (A, B, C). Any time two or more wireless adapters are within range of each other, they can set up an independent network, which is commonly referred to as an ad-hoc network or Independent Basic Service Set (IBSS). The following diagram shows an example of notebook computers using wireless adapters to form an ad-hoc wireless LAN.

Figure 107 Peer-to-Peer Communication in an Ad-hoc Network

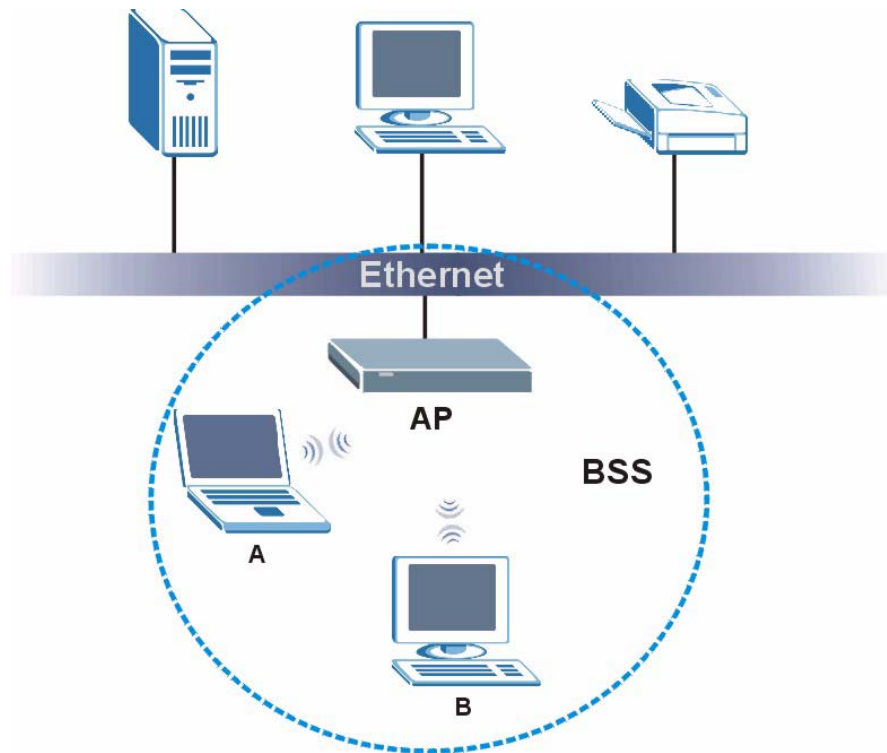


BSS

A Basic Service Set (BSS) exists when all communications between wireless clients or between a wireless client and a wired network client go through one access point (AP).

Intra-BSS traffic is traffic between wireless clients in the BSS. When Intra-BSS is enabled, wireless client **A** and **B** can access the wired network and communicate with each other. When Intra-BSS is disabled, wireless client **A** and **B** can still access the wired network but cannot communicate with each other.

Figure 108 Basic Service Set

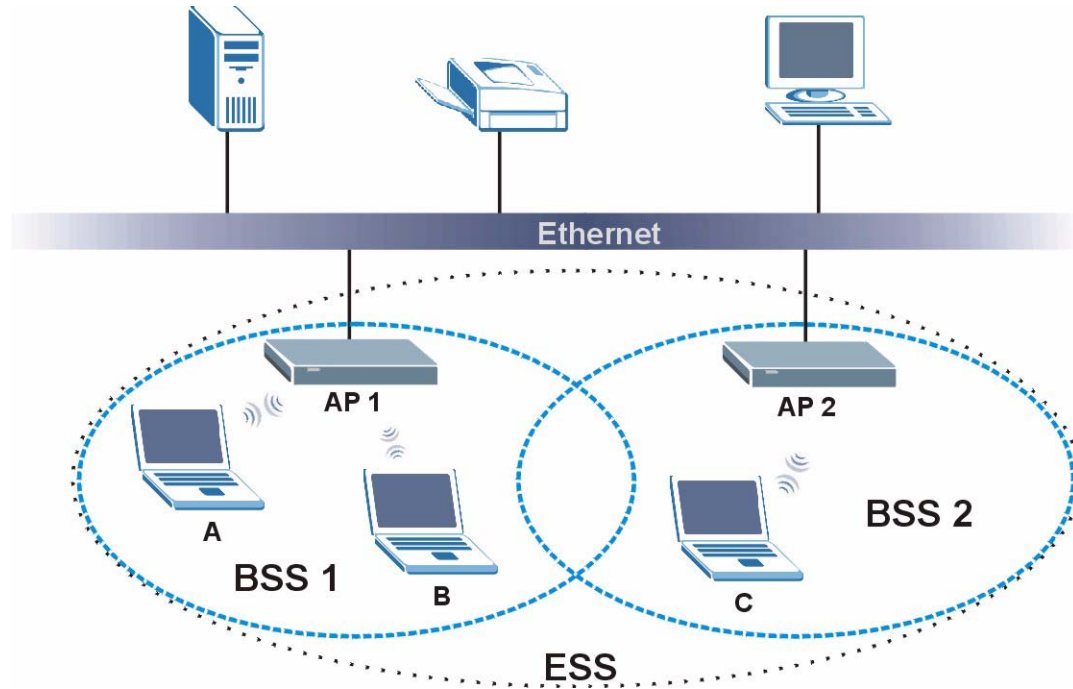


ESS

An Extended Service Set (ESS) consists of a series of overlapping BSSs, each containing an access point, with each access point connected together by a wired network. This wired connection between APs is called a Distribution System (DS).

This type of wireless LAN topology is called an Infrastructure WLAN. The Access Points not only provide communication with the wired network but also mediate wireless network traffic in the immediate neighborhood.

An ESSID (ESS IDentification) uniquely identifies each ESS. All access points and their associated wireless clients within the same ESS must have the same ESSID in order to communicate.

Figure 109 Infrastructure WLAN

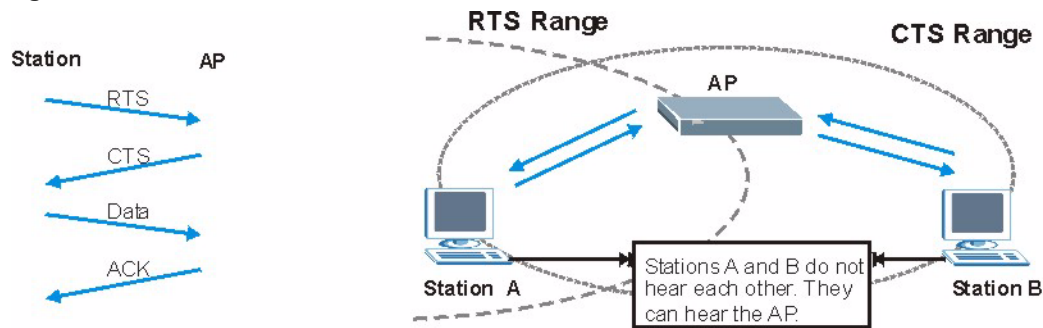
Channel

A channel is the radio frequency(ies) used by IEEE 802.11a/b/g wireless devices. Channels available depend on your geographical area. You may have a choice of channels (for your region) so you should use a different channel than an adjacent AP (access point) to reduce interference. Interference occurs when radio signals from different access points overlap causing interference and degrading performance.

Adjacent channels partially overlap however. To avoid interference due to overlap, your AP should be on a channel at least five channels away from a channel that an adjacent AP is using. For example, if your region has 11 channels and an adjacent AP is using channel 1, then you need to select a channel between 6 or 11.

RTS/CTS

A hidden node occurs when two stations are within range of the same access point, but are not within range of each other. The following figure illustrates a hidden node. Both stations (STA) are within range of the access point (AP) or wireless gateway, but out-of-range of each other, so they cannot "hear" each other, that is they do not know if the channel is currently being used. Therefore, they are considered hidden from each other.

Figure 110 RTS/CTS

When station **A** sends data to the AP, it might not know that the station **B** is already using the channel. If these two stations send data at the same time, collisions may occur when both sets of data arrive at the AP at the same time, resulting in a loss of messages for both stations.

RTS/CTS is designed to prevent collisions due to hidden nodes. An **RTS/CTS** defines the biggest size data frame you can send before an RTS (Request To Send)/CTS (Clear to Send) handshake is invoked.

When a data frame exceeds the **RTS/CTS** value you set (between 0 to 2432 bytes), the station that wants to transmit this frame must first send an RTS (Request To Send) message to the AP for permission to send it. The AP then responds with a CTS (Clear to Send) message to all other stations within its range to notify them to defer their transmission. It also reserves and confirms with the requesting station the time frame for the requested transmission.

Stations can send frames smaller than the specified **RTS/CTS** directly to the AP without the RTS (Request To Send)/CTS (Clear to Send) handshake.

You should only configure **RTS/CTS** if the possibility of hidden nodes exists on your network and the "cost" of resending large frames is more than the extra network overhead involved in the RTS (Request To Send)/CTS (Clear to Send) handshake.

If the **RTS/CTS** value is greater than the **Fragmentation Threshold** value (see next), then the RTS (Request To Send)/CTS (Clear to Send) handshake will never occur as data frames will be fragmented before they reach **RTS/CTS** size.



Enabling the RTS Threshold causes redundant network overhead that could negatively affect the throughput performance instead of providing a remedy.

Fragmentation Threshold

A **Fragmentation Threshold** is the maximum data fragment size (between 256 and 2432 bytes) that can be sent in the wireless network before the AP will fragment the packet into smaller data frames.

A large **Fragmentation Threshold** is recommended for networks not prone to interference while you should set a smaller threshold for busy networks or networks that are prone to interference.

If the **Fragmentation Threshold** value is smaller than the **RTS/CTS** value (see previously) you set then the RTS (Request To Send)/CTS (Clear to Send) handshake will never occur as data frames will be fragmented before they reach **RTS/CTS** size.

Preamble Type

Preamble is used to signal that data is coming to the receiver. **Short** and **Long** refer to the length of the synchronization field in a packet.

Short preamble increases performance as less time sending preamble means more time for sending data. All IEEE 802.11b/g compliant wireless adapters support long preamble, but not all support short preamble.

Select **Long** preamble if you are unsure what preamble mode the wireless adapters support, and to provide more reliable communications in busy wireless networks.

Select **Short** preamble if you are sure the wireless adapters support it, and to provide more efficient communications.

Select **Dynamic** to have the AP automatically use short preamble when wireless adapters support it, otherwise the AP uses long preamble.



The AP and the wireless adapters **MUST** use the same preamble mode in order to communicate.

IEEE 802.11g Wireless LAN

IEEE 802.11g is fully compatible with the IEEE 802.11b standard. This means an IEEE 802.11b adapter can interface directly with an IEEE 802.11g access point (and vice versa) at 11 Mbps or lower depending on range. IEEE 802.11g has several intermediate rate steps between the maximum and minimum data rates. The IEEE 802.11g data rate and modulation are as follows:

Table 23 IEEE 802.11g

DATA RATE (MBPS)	MODULATION
1	DBPSK (Differential Binary Phase Shift Keyed)
2	DQPSK (Differential Quadrature Phase Shift Keying)
5.5 / 11	CCK (Complementary Code Keying)
6/9/12/18/24/36/48/54	OFDM (Orthogonal Frequency Division Multiplexing)

Wireless Security Overview

Wireless security is vital to your network to protect wireless communication between wireless clients, access points and the wired network.

Wireless security methods available on the V660 are data encryption, wireless client authentication, restricting access by device MAC address and hiding the V660 identity.

The following figure shows the relative effectiveness of these wireless security methods available on your V660.

Table 24 Wireless Security Levels

SECURITY LEVEL	SECURITY TYPE
Least Secure	Unique SSID (Default)
	Unique SSID with Hide SSID Enabled
	MAC Address Filtering
	WEP Encryption
	IEEE802.1x EAP with RADIUS Server Authentication
	Wi-Fi Protected Access (WPA)
Most Secure	WPA2



You must enable the same wireless security settings on the V660 and on all wireless clients that you want to associate with it.

IEEE 802.1x

In June 2001, the IEEE 802.1x standard was designed to extend the features of IEEE 802.11 to support extended authentication as well as providing additional accounting and control features. It is supported by Windows XP and a number of network devices. Some advantages of IEEE 802.1x are:

- User based identification that allows for roaming.
- Support for RADIUS (Remote Authentication Dial In User Service, RFC 2138, 2139) for centralized user profile and accounting management on a network RADIUS server.
- Support for EAP (Extensible Authentication Protocol, RFC 2486) that allows additional authentication methods to be deployed with no changes to the access point or the wireless clients.

RADIUS

RADIUS is based on a client-server model that supports authentication, authorization and accounting. The access point is the client and the server is the RADIUS server. The RADIUS server handles the following tasks:

- Authentication
 - Determines the identity of the users.
- Authorization

Determines the network services available to authenticated users once they are connected to the network.

- Accounting
Keeps track of the client's network activity.

RADIUS is a simple package exchange in which your AP acts as a message relay between the wireless client and the network RADIUS server.

Types of RADIUS Messages

The following types of RADIUS messages are exchanged between the access point and the RADIUS server for user authentication:

- Access-Request
Sent by an access point requesting authentication.
- Access-Reject
Sent by a RADIUS server rejecting access.
- Access-Accept
Sent by a RADIUS server allowing access.
- Access-Challenge
Sent by a RADIUS server requesting more information in order to allow access. The access point sends a proper response from the user and then sends another Access-Request message.

The following types of RADIUS messages are exchanged between the access point and the RADIUS server for user accounting:

- Accounting-Request
Sent by the access point requesting accounting.
- Accounting-Response
Sent by the RADIUS server to indicate that it has started or stopped accounting.

In order to ensure network security, the access point and the RADIUS server use a shared secret key, which is a password, they both know. The key is not sent over the network. In addition to the shared key, password information exchanged is also encrypted to protect the network from unauthorized access.

Types of EAP Authentication

This section discusses some popular authentication types: EAP-MD5, EAP-TLS, EAP-TTLS, PEAP and LEAP. Your wireless LAN device may not support all authentication types.

EAP (Extensible Authentication Protocol) is an authentication protocol that runs on top of the IEEE 802.1x transport mechanism in order to support multiple types of user authentication. By using EAP to interact with an EAP-compatible RADIUS server, an access point helps a wireless station and a RADIUS server perform authentication.

The type of authentication you use depends on the RADIUS server and an intermediary AP(s) that supports IEEE 802.1x. .

For EAP-TLS authentication type, you must first have a wired connection to the network and obtain the certificate(s) from a certificate authority (CA). A certificate (also called digital IDs) can be used to authenticate users and a CA issues certificates and guarantees the identity of each certificate owner.

EAP-MD5 (Message-Digest Algorithm 5)

MD5 authentication is the simplest one-way authentication method. The authentication server sends a challenge to the wireless client. The wireless client ‘proves’ that it knows the password by encrypting the password with the challenge and sends back the information. Password is not sent in plain text.

However, MD5 authentication has some weaknesses. Since the authentication server needs to get the plaintext passwords, the passwords must be stored. Thus someone other than the authentication server may access the password file. In addition, it is possible to impersonate an authentication server as MD5 authentication method does not perform mutual authentication. Finally, MD5 authentication method does not support data encryption with dynamic session key. You must configure WEP encryption keys for data encryption.

EAP-TLS (Transport Layer Security)

With EAP-TLS, digital certifications are needed by both the server and the wireless clients for mutual authentication. The server presents a certificate to the client. After validating the identity of the server, the client sends a different certificate to the server. The exchange of certificates is done in the open before a secured tunnel is created. This makes user identity vulnerable to passive attacks. A digital certificate is an electronic ID card that authenticates the sender’s identity. However, to implement EAP-TLS, you need a Certificate Authority (CA) to handle certificates, which imposes a management overhead.

EAP-TTLS (Tunneled Transport Layer Service)

EAP-TTLS is an extension of the EAP-TLS authentication that uses certificates for only the server-side authentications to establish a secure connection. Client authentication is then done by sending username and password through the secure connection, thus client identity is protected. For client authentication, EAP-TTLS supports EAP methods and legacy authentication methods such as PAP, CHAP, MS-CHAP and MS-CHAP v2.

PEAP (Protected EAP)

Like EAP-TTLS, server-side certificate authentication is used to establish a secure connection, then use simple username and password methods through the secured connection to authenticate the clients, thus hiding client identity. However, PEAP only supports EAP methods, such as EAP-MD5, EAP-MSCHAPv2 and EAP-GTC (EAP-Generic Token Card), for client authentication. EAP-GTC is implemented only by Cisco.

LEAP

LEAP (Lightweight Extensible Authentication Protocol) is a Cisco implementation of IEEE 802.1x.

Dynamic WEP Key Exchange

The AP maps a unique key that is generated with the RADIUS server. This key expires when the wireless connection times out, disconnects or reauthentication times out. A new WEP key is generated each time reauthentication is performed.

If this feature is enabled, it is not necessary to configure a default encryption key in the Wireless screen. You may still configure and store keys here, but they will not be used while Dynamic WEP is enabled.



EAP-MD5 cannot be used with Dynamic WEP Key Exchange

For added security, certificate-based authentications (EAP-TLS, EAP-TTLS and PEAP) use dynamic keys for data encryption. They are often deployed in corporate environments, but for public deployment, a simple user name and password pair is more practical. The following table is a comparison of the features of authentication types.

Table 25 Comparison of EAP Authentication Types

	EAP-MD5	EAP-TLS	EAP-TTLS	PEAP	LEAP
Mutual Authentication	No	Yes	Yes	Yes	Yes
Certificate – Client	No	Yes	Optional	Optional	No
Certificate – Server	No	Yes	Yes	Yes	No
Dynamic Key Exchange	No	Yes	Yes	Yes	Yes
Credential Integrity	None	Strong	Strong	Strong	Moderate
Deployment Difficulty	Easy	Hard	Moderate	Moderate	Moderate
Client Identity Protection	No	No	Yes	Yes	No

WPA and WPA2

Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. WPA2 (IEEE 802.11i) is a wireless security standard that defines stronger encryption, authentication and key management than WPA.

Key differences between WPA or WPA2 and WEP are improved data encryption and user authentication.

If both an AP and the wireless clients support WPA2 and you have an external RADIUS server, use WPA2 for stronger data encryption. If you don't have an external RADIUS server, you should use WPA2-PSK (WPA2-Pre-Shared Key) that only requires a single (identical) password entered into each access point, wireless gateway and wireless client. As long as the passwords match, a wireless client will be granted access to a WLAN.

If the AP or the wireless clients do not support WPA2, just use WPA or WPA-PSK depending on whether you have an external RADIUS server or not.

Select WEP only when the AP and/or wireless clients do not support WPA or WPA2. WEP is less secure than WPA or WPA2.

Encryption

Both WPA and WPA2 improve data encryption by using Temporal Key Integrity Protocol (TKIP), Message Integrity Check (MIC) and IEEE 802.1x. WPA and WPA2 use Advanced Encryption Standard (AES) in the Counter mode with Cipher block chaining Message authentication code Protocol (CCMP) to offer stronger encryption than TKIP.

TKIP uses 128-bit keys that are dynamically generated and distributed by the authentication server. AES (Advanced Encryption Standard) is a block cipher that uses a 256-bit mathematical algorithm called Rijndael. They both include a per-packet key mixing function, a Message Integrity Check (MIC) named Michael, an extended initialization vector (IV) with sequencing rules, and a re-keying mechanism.

WPA and WPA2 regularly change and rotate the encryption keys so that the same encryption key is never used twice.

The RADIUS server distributes a Pairwise Master Key (PMK) key to the AP that then sets up a key hierarchy and management system, using the PMK to dynamically generate unique data encryption keys to encrypt every data packet that is wirelessly communicated between the AP and the wireless clients. This all happens in the background automatically.

The Message Integrity Check (MIC) is designed to prevent an attacker from capturing data packets, altering them and resending them. The MIC provides a strong mathematical function in which the receiver and the transmitter each compute and then compare the MIC. If they do not match, it is assumed that the data has been tampered with and the packet is dropped.

By generating unique data encryption keys for every data packet and by creating an integrity checking mechanism (MIC), with TKIP and AES it is more difficult to decrypt data on a Wi-Fi network than WEP and difficult for an intruder to break into the network.

The encryption mechanisms used for WPA(2) and WPA(2)-PSK are the same. The only difference between the two is that WPA(2)-PSK uses a simple common password, instead of user-specific credentials. The common-password approach makes WPA(2)-PSK susceptible to brute-force password-guessing attacks but it's still an improvement over WEP as it employs a consistent, single, alphanumeric password to derive a PMK which is used to generate unique temporal encryption keys. This prevents all wireless devices sharing the same encryption keys. (a weakness of WEP)

User Authentication

WPA and WPA2 apply IEEE 802.1x and Extensible Authentication Protocol (EAP) to authenticate wireless clients using an external RADIUS database. WPA2 reduces the number of key exchange messages from six to four (CCMP 4-way handshake) and shortens the time required to connect to a network. Other WPA2 authentication features that are different from WPA include key caching and pre-authentication. These two features are optional and may not be supported in all wireless devices.

Key caching allows a wireless client to store the PMK it derived through a successful authentication with an AP. The wireless client uses the PMK when it tries to connect to the same AP and does not need to go with the authentication process again.

Pre-authentication enables fast roaming by allowing the wireless client (already connecting to an AP) to perform IEEE 802.1x authentication with another AP before connecting to it.

Wireless Client WPA Supplicants

A wireless client supplicant is the software that runs on an operating system instructing the wireless client how to use WPA. At the time of writing, the most widely available supplicant is the WPA patch for Windows XP, Funk Software's Odyssey client.

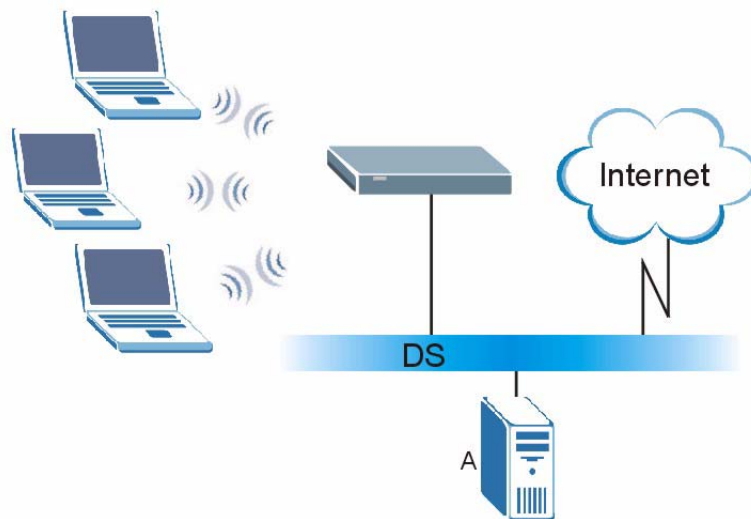
The Windows XP patch is a free download that adds WPA capability to Windows XP's built-in "Zero Configuration" wireless client. However, you must run Windows XP to use it.

WPA(2) with RADIUS Application Example

You need the IP address of the RADIUS server, its port number (default is 1812), and the RADIUS shared secret. A WPA(2) application example with an external RADIUS server looks as follows. "A" is the RADIUS server. "DS" is the distribution system.

- 1 The AP passes the wireless client's authentication request to the RADIUS server.
- 2 The RADIUS server then checks the user's identification against its database and grants or denies network access accordingly.
- 3 The RADIUS server distributes a Pairwise Master Key (PMK) key to the AP that then sets up a key hierarchy and management system, using the pair-wise key to dynamically generate unique data encryption keys to encrypt every data packet that is wirelessly communicated between the AP and the wireless clients.

Figure 111 WPA(2) with RADIUS Application Example



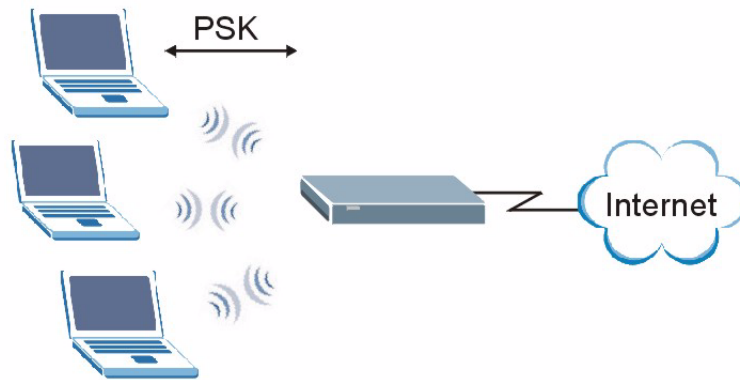
WPA(2)-PSK Application Example

A WPA(2)-PSK application looks as follows.

- 1 First enter identical passwords into the AP and all wireless clients. The Pre-Shared Key (PSK) must consist of between 8 and 63 ASCII characters or 64 hexadecimal characters (including spaces and symbols).
- 2 The AP checks each wireless client's password and (only) allows it to join the network if the password matches.
- 3 The AP and wireless clients use the pre-shared key to generate a common PMK (Pairwise Master Key).

- 4 The AP and wireless clients use the TKIP or AES encryption process to encrypt data exchanged between them.

Figure 112 WPA(2)-PSK Authentication



Security Parameters Summary

Refer to this table to see what other security parameters you should configure for each Authentication Method/ key management protocol type. MAC address filters are not dependent on how you configure these security features.

Table 26 Wireless Security Relational Matrix

AUTHENTICATION METHOD/ KEY MANAGEMENT PROTOCOL	ENCRYPTION METHOD	ENTER MANUAL KEY	IEEE 802.1X
Open	None	No	Disable
			Enable without Dynamic WEP Key
Open	WEP	No	Enable with Dynamic WEP Key
		Yes	Enable without Dynamic WEP Key
		Yes	Disable
Shared	WEP	No	Enable with Dynamic WEP Key
		Yes	Enable without Dynamic WEP Key
		Yes	Disable
WPA	TKIP/AES	No	Enable
WPA-PSK	TKIP/AES	Yes	Disable
WPA2	TKIP/AES	No	Enable
WPA2-PSK	TKIP/AES	Yes	Disable

Antenna Overview

An antenna couples RF signals onto air. A transmitter within a wireless device sends an RF signal to the antenna, which propagates the signal through the air. The antenna also operates in reverse by capturing RF signals from the air.

Positioning the antennas properly increases the range and coverage area of a wireless LAN.

Antenna Characteristics

Frequency

An antenna in the frequency of 2.4GHz (IEEE 802.11b) or 5GHz(IEEE 802.11a) is needed to communicate efficiently in a wireless LAN.

Radiation Pattern

A radiation pattern is a diagram that allows you to visualize the shape of the antenna's coverage area.

Antenna Gain

Antenna gain, measured in dB (decibel), is the increase in coverage within the RF beam width. Higher antenna gain improves the range of the signal for better communications.

For an indoor site, each 1 dB increase in antenna gain results in a range increase of approximately 2.5%. For an unobstructed outdoor site, each 1dB increase in gain results in a range increase of approximately 5%. Actual results may vary depending on the network environment.

Antenna gain is sometimes specified in dBi, which is how much the antenna increases the signal power compared to using an isotropic antenna. An isotropic antenna is a theoretical perfect antenna that sends out radio signals equally well in all directions. dBi represents the true gain that the antenna provides.

Types of Antennas for WLAN

There are two types of antennas used for wireless LAN applications.

- Omni-directional antennas send the RF signal out in all directions on a horizontal plane. The coverage area is torus-shaped (like a donut) which makes these antennas ideal for a room environment. With a wide coverage area, it is possible to make circular overlapping coverage areas with multiple access points.
- Directional antennas concentrate the RF signal in a beam, like a flashlight does with the light from its bulb. The angle of the beam determines the width of the coverage pattern. Angles typically range from 20 degrees (very directional) to 120 degrees (less directional). Directional antennas are ideal for hallways and outdoor point-to-point applications.

Positioning Antennas

In general, antennas should be mounted as high as practically possible and free of obstructions. In point-to-point application, position both antennas at the same height and in a direct line of sight to each other to attain the best performance.

For omni-directional antennas mounted on a table, desk, and so on, point the antenna up. For omni-directional antennas mounted on a wall or ceiling, point the antenna down. For a single AP application, place omni-directional antennas as close to the center of the coverage area as possible.

For directional antennas, point the antenna in the direction of the desired coverage area.

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The device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

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- This device must accept any interference received, including interference that may cause undesired operations.

This device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this device does cause harmful interference to radio/television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1 Reorient or relocate the receiving antenna.
- 2 Increase the separation between the equipment and the receiver.
- 3 Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- 4 Consult the dealer or an experienced radio/TV technician for help.



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- This device has been tested to the FCC exposure requirements (Specific Absorption Rate).
- This device complies with the requirements of Health Canada Safety Code 6 for Canada.
- Testing was performed on laptop computers with antennas at 0mm spacing. The maximum SAR value is: 0.866 W/kg. The device must not be collocated with any other antennas or transmitters.
- The device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2). End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instruction as documented in this manual.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

注意！

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第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

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減少電磁波影響，請妥適使用。

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device has been designed for the WLAN 2.4 GHz network throughout the EC region and Switzerland, with restrictions in France.

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- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

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“+” is the (prefix) number you dial to make an international telephone call.

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